

**Cajon Valley Union School District
Purchasing Department**

225 Roanoke Rd, El Cajon, CA 92020 Phone: (619) 588-3010
P.O. Box 1007, El Cajon, CA 92022 FAX: (619) 441-0843

District website: www.cajonvalley.net/bids

IT IS THE BIDDERS RESPONSIBILITY TO ENSURE THEY HAVE RECEIVED
ALL ADDENDUMS. ADDENDUMS ARE POSTED ON THE DISTRICT WEBSITE.

INVITATION TO BID

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

PRE-BID JOB WALKNone
Prospective Bidders may contact James Beard, Director of Maintenance & Operations,
(619) 588-3023, to make arrangements to visit project site

QUESTION DEADLINE:February 17, 2021, 1:00 p.m.
Questions are to be submitted by e-mail to cropp@cajonvalley.net (reference Bid #1551 in the subject)

BID OPENING DATE:February 24, 2021, 1:00 p.m.
At Cajon Valley Union School District, Purchasing Department, 225 Roanoke Road, El Cajon, CA 92020

CVUSD CONTACT PERSON:..... Amanda Cropp, Buyer, (619) 579-4866, cropp@cajonvalley.net

SUBMITTED BY:

Name of Company

IMPORTANT NOTICE TO BIDDER: The following information should be included on the ENVELOPE when submitting your bid:

1. Name and address of bidder, Bid #, Bid opening date and time.
2. This notice should be cut out and posted on the envelope:

BID OPENING DATE: February 24, 2021	REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY
BID OPENING TIME: 1:00 p.m.	BID OPENING LOCATION: CVUSD Purchasing Department 225 Roanoke Road, El Cajon CA 92020

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- **MUST BE COMPLETED AND RETURNED FOR BID OPENING. THE REST OF THE BID PACKAGE TO BE KEPT FOR YOUR INFORMATION AS CONTRACT DOCUMENTS**

NOTICE INVITING BIDS

The **CAJON VALLEY UNION SCHOOL DISTRICT** will receive sealed bids for:

REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY

at the office of the Purchasing Department, 225 Roanoke Road, El Cajon, California 92020, no later than **February 24, 2021, one o'clock (1:00:00) p.m.**, at which time or thereafter said bids will be opened and read aloud. Time determined by internet: <http://www.time.gov>. Bids received after this time will be returned unopened. Bids shall be valid for 90 calendar days after the bid opening date. Bid opening may also be viewed remotely by joining a Zoom meeting promptly at 1:00 p.m. at <https://cajonvalley.zoom.us/j/91570317385?pwd=VWo0TWc4SWYvemc3b1VRszNmUzQ1UT09> or by phone 1(669) 900-9128; Meeting ID: 915 7031 7385; Passcode: 434744

Contract documents are now on file and copies may be obtained online at www.cajonvalley.net/bids. It is the Bidder's responsibility to ensure they have received all addendums. Addendums are posted on the same District website.

Bids must be accompanied by cash, a certified or cashier's check, or a Bid Bond in favor of the District in an amount not less than ten percent (10%) of the submitted Total Bid Price.

A Pre-Bid Job Walk will not be held for this project. Prospective bidders may contact James Beard, Director, Facilities, Maintenance & Operations, (619) 588-3023, beardj@cajonvalley.net, to make arrangements to visit the sites to become acquainted with the work site(s) for the project.

Each bid shall be accompanied by the security referred to in the Contract Documents, the non-collusion declaration, the list of proposed subcontractors, and all additional documentation required by the bid documents.

The successful bidder will be required to furnish the District with a Performance Bond equal to 100% of the successful bid, and a Payment Bond equal to 100% of the successful bid, prior to execution of the Contract, regardless of the contract amount. All bonds are to be secured from a surety that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure Section 995.120.

Pursuant to Public Contract Code Section 22300, the successful bidder may substitute certain securities for funds withheld by District to ensure his performance under the Contract.

The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract which will be awarded to the successful bidder, copies of which are on file and are available to any interested party at <http://www.dir.ca.gov/dlsr>. A copy of these rates shall be posted by the successful bidder at the job site. The successful bidder and all subcontractor(s) under him, shall comply with all applicable Labor Code provisions, which include, but are not limited to the payment of not less than the required prevailing rates to all workers employed by them in the execution of the Contract, the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

Pursuant to SB854, **No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5** [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code

section 1725.5. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. In bidding on this project, it shall be the Bidder's sole responsibility to evaluate and include the cost of complying with all labor compliance requirements under this contract and applicable law in its bid.

Each bidder shall be a licensed contractor pursuant to the Business and Professions Code and shall be licensed in the following appropriate classification(s) of contractor's license(s), for the work bid upon, and must maintain the license(s) throughout the duration of the Contract: **B-General**.

Pursuant to Public Contract Code Section 3400(b), if the District has made any findings designating certain materials, products, things, or services by specific brand or trade name, such findings and the materials, products, things, or services and their specific brand or trade names will be set forth in the Project Specifications.

Minority, women, and disabled veteran (DVBE) contractors are encouraged to submit bids and bidders are encouraged to make a good faith effort to contact and utilize DVBE subcontractors and suppliers, providing documentation with their bid.

Award of Contract: The District reserves the right to reject any or all bids or to waive any irregularities or ities in any bids or in the bidding process.

For further information, contact Amanda Cropp, Buyer, at (619) 579-4866, cropp@cajonvalley.net. Questions are to be submitted by email no later than February 17, 2021, 1:00 p.m.

Dated this 9th day of February, 2021.

Karen Clark-Mejia, Clerk of the Governing Board
CAJON VALLEY UNION SCHOOL DISTRICT,
San Diego County, California

Publication: The Daily Transcript
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CAJON VALLEY UNION SCHOOL DISTRICT

INSTRUCTIONS TO BIDDERS

1. AVAILABILITY OF CONTRACT DOCUMENTS

Bids must be submitted to the District on the Bid Forms which are a part of the Bid Package for the Project. Prospective bidders may obtain one (1) complete electronic set of Contract Documents at no cost. Contract Documents may be obtained from the District at the location(s) and at the time(s) indicated in the Notice Inviting Bids. Any applicable charges for the Contract Documents are outlined in the Notice Inviting Bids.

The District may also make the Contract Documents available for review at one or more plan rooms, as indicated in the Notice Inviting Bids. Please Note: Prospective bidders who choose to review the Contract Documents at a plan room must contact the District to obtain the required Contract Documents if they decide to submit a bid for the Project.

2. EXAMINATION OF CONTRACT DOCUMENTS

The District has made copies of the Contract Documents available, as indicated above. Bidders shall be solely responsible for examining the Project Site and the Contract Documents, including any Addenda issued during the bidding period, and for informing itself with respect to local labor availability, means of transportation, necessity for security, laws and codes, local permit requirements, wage scales, local tax structure, contractors' licensing requirements, availability of required insurance, and other factors that could affect the Work. Bidders are responsible for consulting the standards referenced in the Contract. Failure of Bidder to so examine and inform itself shall be at its sole risk, and no relief for error or omission will be given except as required under State law.

3. INTERPRETATION OF CONTRACT DOCUMENTS

Discrepancies in, and/or omissions from the Plans, Specifications or other Contract Documents or questions as to their meaning shall be immediately brought to the attention of the District by submission of a written request to the Bid Administrator for an interpretation or correction to the District.

Any interpretation of the Contract Documents will be made only by written addenda duly issued and emailed to each person or firm who has registered for a set of Contract Documents. The District will not be responsible for any explanations or interpretations provided in any other manner. Please Note: Bidders are responsible for ensuring that they have received any and all Addenda. Addenda will be posted on the District's webpage: www.cajonvalley.net under Quick Links, "Bids, RFQ, RFP", Construction. No person is authorized to make any oral interpretation of any provision in the Contract Documents to any bidder, and no bidder should rely on any such oral interpretation.

Bids shall include complete compensation for all items that are noted in the Contract Documents as the responsibility of the Contractor.

4. INSPECTION OF SITE; PRE-BID CONFERENCE AND SITE WALK

Each prospective bidder is responsible for fully acquainting itself with the conditions of the Project Site (which may include more than one site), as well as those relating to the construction and labor of the Project, to fully understand the facilities, difficulties and restrictions which may impact the cost or effort required to complete the Project. To this end, a Pre-Bid Conference and Site Walk may be held on the date(s) and time(s) as indicated in the Notice Inviting Bids.

5. ADDENDA

The District reserves the right to revise the Contract Documents prior to the bid opening date. Revisions, if any, shall be made by written Addenda. All addenda issued by the District shall be included in the bid and made part of the Contract Documents. Pursuant to Public Contract Code Section 4104.5, if the District issues an Addendum which includes material changes to the Project less than 72 hours prior to the deadline for submission of bids, the District will extend the deadline for submission of bids. The District may determine, in its sole discretion, whether an Addendum warrants postponement of the bid submission date. Each prospective bidder shall provide District a name, e-mail address and facsimile number to which Addenda may be sent, as well as a telephone number by which the District can contact the bidder. Copies of Addenda will be furnished by facsimile or e-mail without charge to all parties who have obtained a copy of the Contract Documents and provided such current information. Please Note: Bidders are responsible for ensuring that they have received any and all Addenda. To this end, each bidder should contact the Purchasing Department to verify that he has received all Addenda issued, if any, prior to the bid opening. Addenda will also be posted on the District's webpage: www.cajonvalley.net under Quick Links, "Bids, RFQ, RFP", Construction.

6. ALTERNATE BIDS

If alternate bid items are called for in the Contract Documents, the lowest bid will be determined on the basis of the base bid only. However, the District may choose to award the contract on the basis of the base bid alone or the base bid and any alternate or combination of alternates. The time required for completion of the alternate bid items has been factored into the Contract duration and no additional Contract time will be awarded for any of the alternate bid items. The District may elect to include one or more of the alternate bid items, or to otherwise remove certain work from the Project scope of work, accordingly each Bidder must ensure that each bid item contains a proportionate share of profit, overhead and other costs or expenses which will be incurred by the Bidder.

7. COMPLETION OF BID FORMS

Bids shall only be prepared using copies of the Bid Forms which are included in the Contract Documents. The use of substitute bid forms other than clear and correct photocopies of those provided by the District will not be permitted. Bids shall be executed by an authorized signatory as described in these Instructions to Bidders. In addition, Bidders shall fill in all blank spaces (including inserting "N/A" where applicable) and initial all interlineations, alterations, or erasures to the Bid Forms. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms nor make substitutions thereon. **USE OF BLACK OR BLUE INK, INDELIBLE PENCIL OR A TYPEWRITER IS REQUIRED.** Deviations in the bid form may result in the bid being deemed non-responsive.

8. MODIFICATIONS OF BIDS

Each Bidder shall submit its Bid in strict conformity with the requirements of the Contract Documents. Unauthorized additions, modifications, revisions, conditions, limitations, exclusions or provisions attached to a Bid may render it non-responsive and may cause its rejection. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms, nor make substitutions thereon. Oral, telephonic and electronic modifications will not be considered, unless the Notice Inviting Bids authorizes the submission of electronic bids and modifications thereto and such modifications are made in accordance with the Notice Inviting Bids.

9. DESIGNATION OF SUBCONTRACTORS

Pursuant to the Subletting and Subcontracting Fair Practices Act, Bidders must designate the name, business location, DIR registration number, and California contractor license number of each subcontractor who will perform work or render services for the Bidder in an amount that exceeds one-half of one percent (1/2%) of the Bidder's Total Bid Price, as well as the portion of work each such subcontractor will

perform on the form provided herein by the District. The included "Designation of Subcontractors" form is to be submitted with bid.

10. DISABLED VETERAN BUSINESS ENTERPRISES

Compliance with Disabled Veteran Business Enterprise (DVBE) contracting goals is encouraged for this project. In accordance with Education Code section 17076.11 the District has a DVBE participation goal of 3% per year of the overall dollar amount of state funds allocated to the District pursuant to the Leroy F. Greene School Facilities Act of 1998, and expended each year by the District. The District is encouraging DVBE participation in this project.

Bidders are encouraged to make a good faith effort to contact and utilize DVBE subcontractors and suppliers in securing bids for performance of the contract. Information regarding certified DVBE firms can be obtained from the Office of Small Business Certification and Resources (OSBCR) at (916) 323-5478 or (916) 322-5060 as well as the OSBCR website at www.dgs.ca.gov/osbcr. Verification of DVBE status can be obtained from the OSBCR by receiving an approved certification letter and reference number from that office. Bidders are to attach documentation of any good faith efforts to the bid documents.

Bidders must indicate on the bid form whether they are a certified DVBE and if so, provide a copy of the DVBE Certification Letter issued by OSBCR. Bidders are to also indicate whether a good faith effort was made to include DVBE subcontractors and suppliers in the bid. In addition, bidders are to indicate on the Designation of Subcontractors form whether the subcontractor is DVBE certified, and if so, provide the District a copy of the DVBE Certification Letter issued by OSBCR.

For projects funded by the State, prior to, and as a condition precedent for final payment under the Contract, the successful bidder shall provide the District with written documentation identifying the amount paid to certified DVBE subcontractors and suppliers in performance of the Contract and provide a copy of the DVBE Certification Letter issued by OSBCR for each DVBE. This documentation will be used by the District to evaluate its success in meeting its DVBE participation goal.

11. LICENSING REQUIREMENTS

Pursuant to Section 7028.15 of the Business and Professions Code and Section 3300 of the Public Contract Code, all bidders must possess proper licenses for performance of this Contract. Subcontractors must possess the appropriate licenses for each specialty subcontracted. Pursuant to Section 7028.5 of the Business and Professions Code, the District shall consider any bid submitted by a contractor not currently licensed in accordance with state law and pursuant to the requirements found in the Contract Documents to be nonresponsive, and the District shall reject the Bid. The District shall have the right to request, and Bidders shall provide within five (5) calendar days, evidence satisfactory to the District of all valid license(s) currently held by that Bidder and each of the Bidder's subcontractors, before awarding the Contract.

12. DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) CONTRACTOR REGISTRATION REQUIREMENTS

- a) No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
- b) No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
- c) This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. If awarded a Contract, the Bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project. To this end, Bidder shall sign and submit the Certification of Division of Industrial Relations Registration with its Bid, on the form provided, attesting to the facts contained therein. Failure to submit this form may render the Bid non-responsive. In addition, each Bidder shall provide the registration number for each listed subcontractor in the space provided in the Designation of Subcontractors Form.

13. SIGNING OF BIDS

All Bids submitted shall be executed by the Bidder or its authorized representative. Bidders may be asked to provide evidence in the form of an authenticated resolution of its Board of Directors or a Power of Attorney evidencing the capacity of the person signing the Bid to bind the Bidder to each Bid and to any Contract arising therefrom.

If a Bidder is a joint venture or partnership, it may be asked to submit an authenticated Power of Attorney executed by each joint venturer or partner appointing and designating one of the joint venturers or partners as a management sponsor to execute the Bid on behalf of Bidder. Only that joint venturer or partner shall execute the Bid. The Power of Attorney shall also: (1) authorize that particular joint venturer or partner to act for and bind Bidder in all matters relating to the Bid; and (2) provide that each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of Bidder assumed under the Bid and under any Contract arising therefrom. The Bid shall be executed by the designated joint venturer or partner on behalf of the joint venture or partnership in its legal name.

14. BID GUARANTEE (BOND)

Each bid shall be accompanied by: (a) cash; (b) a certified check made payable to the District; (c) a cashier's check made payable to the District; or (d) a bid bond payable to the District executed by the bidder as principal and surety as obligor in an amount not less than 10% of the maximum amount of the bid, or bid will be rejected as non-responsive. Personal sureties and unregistered surety companies are unacceptable. The surety insurer shall be California admitted surety insurer, as defined in Code of Civil Procedure Section 995.120. The cash, check or bid bond shall be given as a guarantee that the bidder shall execute the Contract if it be awarded to the bidder. Upon award, Bidder shall provide the executed contract, payment and performance bonds, and insurance certificates and endorsements as required herein within five (5) business days after notification of the award of the Contract to the bidder. Failure to provide the required documents may result in forfeiture of the bidder's bid deposit or bond to the District and the District may award the Contract to the next lowest responsible bidder, or may call for new bids.

Rating for the surety must be A++, A+, A, or no less than A-. Rating information can be obtained from Best's State Rate Filings: <http://www.ambest.com/bsrf>

15. SUBMISSION OF SEALED BIDS

Once the Bid and supporting documents have been completed and signed as set forth herein, they shall be placed, along with the Bid Guarantee and other required materials in an envelope, sealed, addressed and delivered or mailed, postage prepaid to the District at the place and to the attention of the person indicated in the Notice Inviting Bids. No oral or telephonic bids will be considered. No forms transmitted via the internet, e-mail, facsimile, or any other electronic means will be considered unless specifically authorized by District as provided herein.

Only where expressly permitted in the Notice Inviting Bids, may Bidders submit their bids via electronic transmission pursuant to Public Contract Code Sections 1600 and 1601. The acceptable method(s) of electronic transmission shall be stated in the Notice Inviting Bids. District reserves the right to not accept electronically transmitted bids where not specifically authorized in the Notice Inviting Bids, and may reject any bid not strictly complying with District's designated methods for delivery.

16. DELIVERY AND OPENING OF BIDS

Bids will be received by the District at the address shown in the Notice Inviting Bids up to the date and time shown therein. The District will leave unopened any Bid received after the specified date and time, and any such unopened Bid will be returned to the Bidder. It is the Bidder's sole responsibility to ensure that its Bid is received as specified. Bids may be submitted earlier than the dates(s) and time(s) indicated.

Bids will be opened at the date and time stated in the Notice Inviting Bids, and the amount of each Bid will be read aloud and recorded. All Bidders may, if they desire, attend the opening of Bids. The District may in its sole discretion, elect to postpone the opening of the submitted Bids. District reserves the right to reject any or all Bids and to waive any ity or irregularity in any Bid. In the event of a discrepancy between the written amount of the Bid Price and the numerical amount of the Bid Price, the written amount shall govern.

17. WITHDRAWAL OF BID

Prior to bid opening, a Bid may be withdrawn by the Bidder only by means of a written request signed by the Bidder or its properly authorized representative.

18. BASIS OF AWARD; BALANCED BIDS

The award of the contract, if made by the Owner, will be to the lowest responsive, responsible bidder(s) therefore. The District may reject as non-responsive any bid which unevenly weights or allocates costs, including but not limited to overhead and profit to one or more particular bid items. The District reserves the right to reject any or all bids or to waive any irregularities or ities in any bids or in the bidding process.

19. IDENTICAL BIDS

Pursuant to Section 20117 of the Public Contract Code, in the event there are two or more identical lowest or highest bids, as the case may be, submitted to a school district for the purchase, sale or lease of real property, supplies, materials, equipment, services, bonds, or the awarding of any contract, pursuant to a provision requiring competitive bidding, the governing board of any school district may determine by lot which bid shall be accepted.

When bids are equal, they shall be awarded by lot, and shall be witnessed by three (3) impartial observers.

20. DISQUALIFICATION OF BIDDERS; INTEREST IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a sub-proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other bidders or making a prime proposal.

21. INSURANCE REQUIREMENTS

The successful bidder shall procure the insurance in the form and in the amount specified in the Contract Documents.

22. AWARD PROCESS

Once all Bids are opened and reviewed to determine the lowest responsive and responsible Bidder, the District Board may award the contract. The apparent successful Bidder should begin to prepare the following documents: (1) the Performance Bond; (2) the Payment Bond; and (3) the required insurance certificates and endorsements. Once the District notifies the Bidder of the award, the Bidder will have five (5) business days from the date of this notification to execute the Contract and supply the District with all of the required documents and certifications. Once the District receives all of the properly drafted and executed documents and certifications from the Bidder, the District shall issue a Notice to Proceed to that Bidder.

23. FILING OF BID PROTESTS

Bidders have the right to protest as described below. Whether concerns are about a Request for Proposal (RFP), Request for Quotation or Qualification (RFQ) or an Invitation for Bid (IFB), the following shall apply. The term "Bids" shall refer to either an RFP/Q or an IFB process.

Inquiry or Intention does not constitute a Protest: Notice of an intention to protest does not substitute for filing of a protest following the form and content required within the deadlines stated. Further, casual inquiry or complaint that does not specifically identify the purpose as a protest, and does not comply with the form, content and deadlines herein, are also not considered or acted upon as a protest action.

Certain **concerns must be filed as a protest before bids are due.** Any matter known - or that should have been known - before the bid deadline, must be brought to the Purchasing Department, Bid Administrator, in writing at least three (3) business days before the bid deadline. Such matters include, but are not limited to:

- 1) Complaints about events or decisions made before the solicitation deadline,
- 2) Complaints that the solicitation unduly constrains competition through improper minimum qualifications or specifications,
- 3) Complaints that the pre-bid conference was not fair or accessible,
- 4) Complaints that questions were not fully or properly addressed by the District.
- 5) Complaints that the RFP/Q or IFB did not provide adequate information or contained an improper criteria;
- 6) Other matters known or that should have been known, to interested bidders by reading the solicitation document.

Protest on items known after bid deadline:

After the bid deadline, **only** vendors that submitted a bid are eligible to protest. Only Vendors who would be the next apparent low bidder if the bid protest is successful are eligible to protest.

Grounds for Protest and Protest Form: A written, formal protest must contain the following to be considered. Failure to provide the following information could result in rejection of the protest.

- 1) Company name, mailing address, phone number, and name of company individual responsible for submission of the protest;
- 2) The Bid Number and title;
- 3) The specific action or decision protested to include;
 - a) a specific identification of the statutory or regulatory provision(s) that the action complained of is alleged to have violated;
 - b) a specific description of each act alleged to have violated the statutory or regulatory provision(s) identified in the above paragraph (a) of this subsection;
 - c) a precise statement of the relevant facts;
 - d) an identification of the issue or issues to be resolved; and
 - e) argument and authorities in support of the protest.
- 4) Indicate what relief or corrective action you believe the District should make.
- 5) Demonstrate that every reasonable effort was made within the schedule provided, for you to resolve the basis of the protest during the process, including asking questions, seeking clarification, requesting addenda, and otherwise alerting the District to any perceived problems.
- 6) Signed by an authorized agent of the company.
- 7) Deliveries by hand, or fax (must be followed up with a hard copy), in acceptable formats. Deliveries by e-mail will not be accepted. The District is not responsible to assure the protest is received within the protest deadlines. If the District does not receive the protest within the specified deadline, the protest will be rejected. The follow up mailing address for all protests:

Cajon Valley School District
Director, Purchasing, Warehouse & Duplicating Services
225 Roanoke Road
El Cajon, CA 92020

Protest Deadlines:

- 1) Protests must be received in the Purchasing Office no later than 4:00 p.m. Pacific Time, five (5) business days after the date the RFP/Q or IFB recap is posted on the Purchasing web page under "Bid Recap Results". Webpage: www.cajonvalley.net
- 2) Protests received after the time specified are untimely and may be denied on that basis unless the District concludes that the issues raised by the protest involve fraud, gross abuse of the procurement process, or indicate substantial prejudice to the integrity of the procurement process.

- 3) The Purchasing Department shall make efforts to distribute the recap to the affected bidder(s), such as posting on the District's website or faxing the notice to the affected bidder(s). However, it is the Bidder's responsibility to seek out and obtain the announcement from the District. The District is not responsible for assuring the Bidders have learned of the announcement in time to file a protest.

Protest Process and Appeals

- 1) The Purchasing Director will review the protest. All available facts will be considered and the Purchasing Director shall issue a decision. This decision shall be delivered in writing by e-mail or fax (will be followed up with a hard copy).
- 2) If the Protesting party believes the Purchasing Director has failed to consider a fact and has made an error in the protest decision, the protesting bidder has a right to appeal that decision. The appeal is limited to only those matters brought forward to the District in the original protest. The appeal must clearly state why the Purchasing Director's decision is in error.
- 3) The protesting bidder shall issue a Protest Appeal Statement by 4:00 PM (Pacific Standard Time) by the third (3rd) business day following issuance of the Purchasing Director's decision. This appeal shall be delivered by the Protesting vendor, in writing by hand delivery or fax (must be followed up with a hard copy). Delivery by e-mail will not be accepted.
- 4) The District's Legal Counsel will evaluate the appeal and issue a decision, which will be final.

NOTHING HEREIN SHALL DIMINISH THE AUTHORITY OF THE CAJON VALLEY UNION SCHOOL DISTRICT TO ENTER INTO A CONTRACT, WHETHER A PROTEST ACTION OR INTENTION TO PROTEST HAS BEEN ISSUED.

24. WORKERS COMPENSATION

Each bidder shall submit the Contractor's Certificate Regarding Workers' Compensation form with the bid or the bid will be rejected as non-responsive.

25. SUBSTITUTION OF SECURITY

The Contract Documents call for monthly progress payments based upon the percentage of the work completed. The District will retain five percent (5%) of each progress payment as provided by the Contract Documents. At the request and expense of the successful Bidder, the District will substitute securities for the amount so retained in accordance with Public Contract Code Section 22300.

26. PREVAILING WAGES

The Bidder to which the District awards a contract for the Project, and each of that Bidder's subcontractors of any tier, shall be required to pay not less than the general prevailing rates of per-diem wages in the locality in which the work is to be performed for each craft or type of worker needed to execute the contract ("Prevailing Wages"). All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement). The successful bidder must retain copies of certified payrolls for a minimum of five years from the date of completion and submit upon the request of the District or its authorized agent. Awarded Bidder shall post a copy of the per-diem rates of Prevailing Wages at the site of the Project. Rates are available at <http://www.dir.ca.gov/dlsr/pwd/index.htm>

27. DEBARMENT OF CONTRACTORS AND SUBCONTRACTORS

In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to the District. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

28. PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

Within the time specified in the Contract Documents, the Bidder to whom a Contract is awarded shall deliver to the District four identical counterparts of the Performance Bond and Payment Bond in the form supplied by the District and included in the Contract Documents. Failure to do so may, in the sole discretion of District, result in the forfeiture of the Bid Guarantee. The surety supplying the bond must be an admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, authorized to do business as such in the State of California and satisfactory to the District. The Performance Bond and the Payment Bond shall be for one hundred percent (100%) of the Total Bid Price.

Rating for the surety must be A++, A+, A, or no less than A-. Rating information can be obtained from Best's State Rate Filings: <http://www.ambest.com/bsrf>

29. REQUEST FOR SUBSTITUTIONS

The successful bidder shall comply with the substitution request provisions set forth in the General Conditions and/or Special Conditions, including any deadlines for substitution requests **which may occur prior to the bid opening date**.

30. SALES AND OTHER APPLICABLE TAXES, PERMITS, LICENSES AND FEES

Contractor and its subcontractors performing work under this Contract will be required to pay California sales tax and other applicable taxes, and to pay for permits, licenses and fees required by the agencies with authority in the jurisdiction in which the work will be located, unless otherwise expressly provided by the Contract Documents.

31. EXECUTION OF CONTRACT

As required herein the Bidder to whom an award is made shall execute the Contract in the amount determined by the Contract Documents. The District may require appropriate evidence that the persons executing the Contract are duly empowered to do so.

32. REQUIRED CERTIFICATIONS

Bidders, for all projects, are required to submit the "Asbestos-Free Materials Certification." This form is included in this package and must be signed under the penalty of perjury and dated, and shall be submitted to the District with the bid. The successful bidder shall also execute, under the penalty of perjury and dated, the "Recycled Content Certification" and the "Drug-Free Workplace Certification" included in this package and submit with the bid. Further, by law it is the District's responsibility to determine whether a contractor must provide fingerprint certification. Pursuant to Education Code section 45125.2, the District considers the totality of the circumstances in order to determine if fingerprinting of employees of a contractor working on a school site is required. Factors to be considered include the length of time the contractor's employees are on school grounds, whether students are in proximity with

the location where the contractor's employees are working, and whether the contractor's employees are working alone or with others. **A determination regarding whether fingerprint certification is required is contained in the Special Conditions.** These forms are included with the bid package and must be signed under the penalty of perjury and dated.

33. GRATUITIES

Bidders shall not provide, offer, imply, or otherwise extend any gratuities, including cash gifts, services, allowances, or enticements in any manner or form, to officers, employees, students, agents, or representatives of the District.

34. IRS REQUIREMENTS

The Owner shall view the legal position of the bidder as an "independent contractor" and that all persons employed to furnish services are employees of the bidder and not of the Owner.

- a The Owner shall not be liable for any of the contractor's acts or omissions performed under the contract to which the bidder.
- b The successful bidder will complete IRS form W-9 providing taxpayer identification number and also indicate whether bidder is a corporation, sole-proprietor, partnership, individual, etc. This form will be sent to the successful bidder with the Agreement, Performance and Payment Bond and is to be returned with same.

END OF INSTRUCTIONS TO BIDDERS

BID FORM

To be returned with bid documents:

LEGAL NAME OF BIDDER: _____

Business Name: _____

Contact Name: _____

Business Address: _____

Phone Number: (_____) _____

FAX: (_____) _____

E-Mail Address: _____

Company Website: _____

Check if Credit Card payment is accepted for no additional charge:

Vendor accepts: _____ Visa _____ American Express

The undersigned, hereby declare that we have carefully examined the location of the proposed Work, and have read and examined the Contract Documents, including all plans, specifications, and all addenda, if any, for the following Project:

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

We hereby propose to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the Project for the following bid prices:

BASE BID	BID PRICE (IN WRITTEN FORM) Said Sum includes all applicable taxes and costs	BID PRICE (IN NUMBERS) Said Sum includes all applicable taxes and costs
<u>BASE BID</u> Bostonia Language Academy 1390 Broadway El Cajon, CA 92021		\$ _____

BASE BID	BID PRICE (IN WRITTEN FORM) Said Sum includes all applicable taxes and costs	BID PRICE (IN NUMBERS) Said Sum includes all applicable taxes and costs
<u>ALLOWANCE</u> *Owner Allowance for unforeseen conditions	Thirty-five thousand dollars and zero cents	<u>\$35,000.00</u>
<u>TOTAL BASE BID</u> (Base Bid plus Allowance)		\$ _____
<p>*The allowance is to be added to the contractor's base bid amount for Base Bid. All work performed under the allowance shall be directed by the District. The Contractor shall be responsible to document all costs incurred and provide all required documentation to the District within 60 days of execution of work, and prior to billing for said work. Each allowance shall be listed as a line item on the Contractor's Schedule of Values. A deductive change order will be prepared for any portion of allowances not used.</p>		

The Owner reserves the right to reject any or all bids, or to waive any irregularities or ities in any bids or in the bidding. The award of the contract, if made by the Owner, will be to the lowest responsive, responsible bidder therefore. The lowest bid will be determined on the basis of the TOTAL BASE BID. In case of discrepancy between the written price and the numerical price, the written price shall prevail.

In case of discrepancy between the written price and the numerical price, the written price shall prevail.

The undersigned agrees that this Bid Form constitutes a firm offer to the District which cannot be withdrawn for the number of calendar days indicated in the Notice Inviting Bids from and after the bid opening, or until a Contract for the Work is fully executed by the District and a third party, whichever is earlier.

The Contract duration shall commence on the date stated in the District's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents. In no case shall the Contractor commence construction prior to the date stated in the District's Notice to Proceed.

Bidder certifies that it is licensed in accordance with the law providing for the registration of Contractors,

License No. _____, Expiration Date _____, class of license _____. If the bidder is a joint venture, each member of the joint venture must include the above information.

List all other classifications for this license number

Bidder is to indicate if they are a Certified DVBE Contractor (Attached is a copy of DVBE Certification Letter issued by OSBCR, if applicable).

_____ Yes _____ No

Bidder is to indicate if a Good Faith Effort was made to include DVBE Subcontractors and suppliers in the Bid (Indicating "No" does not disqualify the bid):

_____ Yes _____ No

The undersigned acknowledges receipt, understanding and full consideration of the following addenda to the Contract Documents.

Addenda No. _____

Addenda No. _____

Addenda No. _____

Addenda No. _____

1. The required Certification Of Contractor And Subcontractor Division Of Industrial Relations Registration form is attached hereto or bidder's bid will be rejected as nonresponsive.
2. The required Contractor's Certificate Regarding Workers' Compensation is attached hereto or bidder's bid will be rejected as nonresponsive.
3. The required bid security in the amount of not less than 10% of the Total Bid Price is attached hereto or bidder's bid will be rejected as nonresponsive.
4. The required Designation of Subcontractors is attached hereto or bidder's bid will be rejected as nonresponsive.
5. The Information of Bidders (List of Current Projects & List of Completed Projects) is attached hereto.
6. The required Asbestos-Free Materials Certification is attached hereto or bidder's bid will be rejected as nonresponsive.
7. The required Recycled Content Certification is attached hereto or bidder's bid will be rejected as nonresponsive.
8. ~~The required Fingerprinting Requirement Certification is attached hereto or bidder's bid will be rejected as nonresponsive.~~ (not required for this project)
9. The required Contractors Statement Regarding Maintaining a Drug Free Workplace is attached hereto or bidder's bid will be rejected as nonresponsive.
10. The required Non-Collusion Declaration is attached hereto or bidder's bid will be rejected as nonresponsive.
11. The required Iran Contracting Act form is attached hereto if bidder's bid total is \$1 million or more.

I hereby certify under penalty of perjury under the laws of the State of California, that all of the information submitted in connection with this Bid and all of the representations made herein are true and correct.

Business Name of Bidder

Authorized Signature

Name and Title

Dated

**CERTIFICATION OF CONTRACTOR AND
SUBCONTRACTOR DIVISION OF INDUSTRIAL RELATIONS REGISTRATION**

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

Pursuant to Public Contract Code Section 1725.5, a contractor or subcontractor must be registered with the Department of Industrial relations in order to bid on, to be listed in a bid proposal or to engage in the performance of any defined public work contract.

I _____, _____ certify that
(Contractor Representative Name) (Title)

_____ is currently registered as a contractor with the Department of Industrial
(Contractor Business Name)

Relations (DIR):

Contractor's DIR Registration Number: _____

Expiration date June 30, 20__

Contractor further acknowledges:

1. Contractor shall maintain DIR registered status for the duration of the project without a gap in registration.
2. Contractor shall note in its invitation to bid the DIR's registration requirement for all subcontractors and their subcontractors.
3. Contractor shall ensure that all subcontractors are registered at time of bid opening and maintain registered status for the duration of the project.
4. Contractor is to furnish DIR Registration Number for all subcontractors on the project within 24 hours of the bid opening.
5. Contractor shall substitute any subcontractor with a DIR registered contractor if listed subcontractor is unable to perform the work.

Failure to comply with any of the above may result in a determination of non-responsiveness.

I declare under penalty of perjury under California law that the foregoing is true and correct.

Signature

Date

CONTRACTOR'S CERTIFICATE REGARDING WORKERS' COMPENSATION

REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY

To be returned with bid documents:

Labor Code section 3700 in relevant part provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this State.
- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

I am aware of the provisions of section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

Signature

Printed Name

Title

Company

(In accordance with article 5 (commencing at section 1860), chapter 1, part 7, division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under this contract.)

Dated _____

BID BOND

To be returned with bid documents:

The makers of this bond are, _____, as Principal, and _____, as Surety and are held and firmly bound unto the **Cajon Valley Union School District**, hereinafter called the District, in the penal sum of TEN PERCENT (10%) OF THE TOTAL BID PRICE of the Principal submitted to DISTRICT for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted the accompanying bid dated _____, 20_____, for

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

If the Principal does not withdraw its bid within the time specified in the Contract Documents; and if the Principal is awarded the Contract and provides all documents to the District as required by the Contract Documents; then this obligation shall be null and void. Otherwise, this bond will remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents shall in affect its obligation under this bond, and Surety does hereby waive notice of any such changes.

In the event a lawsuit is brought upon this bond by the District and judgment is recovered, the Surety shall pay all litigation expenses incurred by the District in such suit, including reasonable attorneys' fees, court costs, expert witness fees and expenses.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____ day of _____, 20_____, the name and corporate seal of each corporation.

(Corporate Seal)

Principal

By _____

Title _____

(Corporate Seal)

Surety

By _____

Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title _____

For District Informational Purpose:

Surety Company Name	_____	Contact	_____
Address	_____	Phone	_____
City, State & Zip	_____	Fax	_____

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA

COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally

appeared _____, who proved to me on the basis of satisfactory

Name(s) of Signer(s)

evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

DESCRIPTION OF ATTACHED DOCUMENT

- ☐ Individual
☐ Corporate Officer

Title(s)

- ☐ Partner(s) ☐ Limited
 ☐ General

- ☐ Attorney-In-Fact
☐ Trustee(s)
☐ Guardian/Conservator
☐ Other:

Signer is representing:

Name Of Person(s) Or Entity(ies)

Title or Type of Document

Number of Pages

Date of Document

Signer(s) Other Than Named Above

NOTE: A copy of the Power-of-Arrow to local representatives of the bonding company must be attached hereto.

DESIGNATION OF SUBCONTRACTORS

REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY

To be returned with bid documents:

In compliance with the Subletting and Subcontracting Fair Practices Act of the Public Contract Code of the State of California, each bidder shall set forth below: (a) the name, the location of the place of business, and the California contractor license number and (b) the portion of the work which will be done by each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of 1 percent (1/2%) of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater.

If no subcontractor is specified, for a portion of the work, or if more than one subcontractor is specified for the same portion of Work, to be performed under the Contract in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price or \$10,000, whichever is greater if the work involves streets or highways, then the Contractor shall be deemed to have agreed that it is fully qualified to perform that Work, and that it shall perform that portion itself.

Name of Bidder _____

Portion of Work	Division of Work or Trade, License, Type	Subcontractor	Complete Address, including Zip Code	CSLB Contractor's License Number	DIR Registration Number	If certified DVBE, List DVBE Reference Number

Portion of Work	Division of Work or Trade, License, Type	Subcontractor	Complete Address, including Zip Code	CSLB Contractor's License Number	DIR Registration Number	If certified DVBE, List DVBE Reference Number

A. LIST OF CURRENT PROJECTS (Backlog)

To be returned with bid documents:

[**Duplicate Page if needed for listing additional current projects, or attach list to this page.**]

Project	Description of Bidder's Work	Anticipated Completion Date	Cost of Bidder's Work / Contract Amount	Contact Person/ Phone Number

B. LIST OF COMPLETED PROJECTS - LAST THREE YEARS

To be returned with bid documents:

[**Duplicate Page if needed for listing additional completed projects, or attach list to this page.**]

Please include only those projects which are similar enough to demonstrate Bidder's ability to perform the required Work.

Project Client	Description of Bidder's Work	Period of Performance	Cost of Bidder's Work / Contract Amount	Contact Name/ Phone Number

ASBESTOS-FREE MATERIALS CERTIFICATION

To be returned with bid documents:

The undersigned declares that he or she is the person who executed the bid for the **REQUEST FOR BID NO. 1551, RELOCATABLE CLASSROOM MOVES, BOSTONIA LANGUAGE ACADEMY**, (hereinafter referred to as the "Project"), and submitted it to the **CAJON VALLEY UNION SCHOOL DISTRICT** (hereinafter referred to as the "District") on behalf of

_____ (hereinafter referred to as the "Contractor").

To the best of my knowledge, information and belief, in completing the Contractor's Work for the Project, no material furnished, installed or incorporated into the Project will contain, or in itself be composed of, any materials listed by the federal or state EPA or federal or state health agencies as a hazardous material.

Any disputes involving the question of whether or not material installed with asbestos-containing equipment is settled by electron microscopy; the cost of any such tests shall be paid by the Contractor.

All work or materials installed by the Contractor which is found to contain asbestos, or work or material installed with asbestos-containing equipment, will be immediately rejected and this work shall be removed and replaced by the Contractor at no additional cost to the District.

Decontamination and removal of work found to contain asbestos or work installed with asbestos-containing equipment shall be done only under supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency.

The Asbestos Removal Contractor shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved the District who shall have sole discretion and final determination in this matter.

The Asbestos Consultant shall be chosen and approved by the District who shall have sole discretion and final determination in this matter.

The work will be not accepted until asbestos contamination is reduced to levels deemed acceptable by the Asbestos Consultant.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this _____ day of _____, 20__ at _____.

Name of Contractor (Print or Type) _____

By _____
Signature Print Name

Title

RECYCLED CONTENT CERTIFICATION

To be returned with bid documents:

The undersigned declares that he or she is the person who executed the bid for:

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

(hereinafter referred to as the "Project"), and submitted it to the **Cajon Valley Union School District** (hereinafter referred to as the "District") on behalf of

_____ hereinafter referred to as the "Contractor").

Pursuant to Public Contract Code Section 10308.5, all contractors are required to certify in writing under penalty of perjury the minimum (if not exact) percentage of recycled content in materials, goods, or supplies offered or products used in the performance of their contract, regardless of whether the product meets the required recycled product percentage as defined in Sections 12161 and 12200. The recycled content shall include both post consumer material and secondary material as defined in Public Contract Code Sections 12161 and 12200 shall apply.

I declare under penalty of perjury under the laws of the State of California that the following percentages of Postconsumer Material and Secondary Material is in the materials, goods or supplies offered for, or products used in, the performance of the Contract for the Project:

_____ % Postconsumer Material _____ % Secondary Material.

Executed on this _____ day of _____, 20____ at _____.

Name of Contractor (Print or Type) _____

By _____
Signature Print Name

Title

CONTRACTOR'S STATEMENT REGARDING MAINTAINING A DRUG FREE WORKPLACE

REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY

To be returned with bid documents:

CAJON VALLEY Union School District Policy 4020 in relevant part provides:

The Governing Board of the CAJON VALLEY Union School District believes that the maintenance of a drug free workplace is essential to school and District operations and is committed to maintaining safe, healthful, and efficient working conditions for all employees. The use of illegal drugs or abuse of alcohol or a controlled substance by employees threatens all of these and will not be tolerated. Job performance deterioration resulting from abuse of drugs and/or alcohol will result in adverse personnel action. The unlawful manufacturer, distribution, dispensation, possession, or use of a controlled substance is prohibited in the workplace.

The Governing Board of the CAJON VALLEY Union School District believes that to further the objective of providing a safe, efficient, and productive workplace, contractors with whom the District contracts for public works projects through the formal bid process, or consultants with whom the District contracts, must agree that while performing services for the District or on District property such consultants, contractors, and vendors, or its employees or agents, shall not in any way be impaired due to being under the influence of alcohol or an illegal drug(s). The use of illegal drugs or abuse of alcohol or a controlled substance threatens the District objective in providing a safe, efficient, and productive workplace and will not be tolerated. No one shall possess an open container of alcohol or consume alcohol, or possess, or be under the influence of an illegal drug, nor shall they sell, offer, or provide alcohol or an illegal drug(s) to another person. All District consultants, contractors, and vendors shall inform their employees and agents that are performing service for the District of the District's objective of a safe, healthful, and productive workplace and the prohibition of drug or alcohol use or impairment from same while performing such service for the District.

Each District consultant, contractor and vendor shall, moreover, advise the District whether they have a policy or procedure for maintaining a drug free workplace at the consultant's, contractor's, or vendor's own place of business and if so, shall briefly describe it in writing to District officials.

If awarded contract for above referenced bid, contractor agrees to comply with CVUSD Board Policy 4020 as detailed above.

**In accordance with the above, the following must be signed
and filed with the awarding body as part of the bid package.**

Business name: _____

Does _____ *Does not* _____ *Have a policy or procedure for maintaining a drug free
workplace at their own place of business.*

_____ *Attached is a copy of such policy or procedure or*

_____ *Following is a brief description of such policy or procedure:*

Signature: _____ *Date:* _____

Title: _____

Legal Reference: the Drug Free Workplace Act of 1988 and Public Law 100-690 Section 5151-5160

NON-COLLUSION DECLARATION

REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares: I am the _____ of _____, the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose. Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____(date), at _____(city), _____(State).

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Signature of Bidder: _____ Date _____

IRAN CONTRACTING ACT
CERTIFICATION OF ELIGIBILITY TO BID FOR CONTRACTS OF \$ 1 MILLION OR MORE
(Public Contract Code sections 2202-2208)

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID /IF BID TOTAL IS \$1 MILLION OR MORE

Pursuant to Public Contract Code 2204. (a) A public entity shall require a person that submits a bid or proposal to, or otherwise proposes to enter into or renew a contract with, a public entity with respect to a contract for goods or services of one million dollars (\$1,000,000) or more to certify, at the time the bid is submitted or the contract is renewed, that the person is not identified on a list created pursuant to subdivision (b) of Section 2203 as a person engaging in investment activities in Iran described in subdivision (a) of Section 2202.5, or as a person described in subdivision (b) of Section 2202.5, as applicable. A state agency shall submit the certification information to the Department of General Services.

To comply with this requirement, please insert your vendor or financial institution name and Federal ID Number (if available) and complete **one** of the options below. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of \$250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (Public Contract Code section 2205.)

OPTION #1 - CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the vendor/financial institution identified below, and the vendor/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

<i>Vendor Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

OPTION #2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a vendor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services.

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

<i>Vendor Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

CONTRACT

THIS CONTRACT is made this _____ day of _____, 20____, in the County of San Diego, State of California, by and between the **CAJON VALLEY UNION SCHOOL DISTRICT**, hereinafter called District, and _____, hereinafter called Contractor. The District and the Contractor for the considerations stated herein agree as follows:

ARTICLE 1. SCOPE OF WORK. The Contractor shall perform all Work within the time stipulated the Contract and shall provide all labor, materials, equipment, tools, utility services, and transportation to complete all of the Work required in strict compliance with the Contract Documents as specified in Article 5 below for the following Project:

REQUEST FOR BID NO. 1551 RELOCATABLE CLASSROOM MOVES BOSTONIA LANGUAGE ACADEMY

The Contractor and its surety shall be liable to the District for any damages arising as a result of the Contractor's failure to comply with this obligation.

ARTICLE 2. TIME FOR COMPLETION. The Work shall be commenced on the date stated in the District's Notice to Proceed. As specified in District's notice to proceed, the work shall be completed within:

Beginning Date of Contract: July 1, 2021
Ending Date of Contract: July 30, 2021 *

The Contractor shall complete all Work required by the Contract Documents within ***thirty (30)** calendar days from the commencement date stated in the Notice to Proceed. By its signature hereunder, Contractor agrees the time for completion set forth above is adequate and reasonable to complete the Work.

ARTICLE 3. CONTRACT PRICE. The District shall pay to the Contractor as full compensation for the performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, and including all applicable taxes and costs, the sum of _____ Dollars (\$ _____). Payment shall be made as set forth in the General Conditions.

ARTICLE 4. LIQUIDATED DAMAGES. In accordance with Government Code section 53069.85, it is agreed that the Contractor will pay the District the sum of five hundred dollars (**\$500**) per site for each and every calendar day of delay beyond the time prescribed in the Contract Documents for finishing the Work, as Liquidated Damages and not as a penalty or forfeiture. In the event this is not paid, the Contractor agrees the District may deduct that amount from any money due or that may become due the Contractor under the Contract. This Article does not exclude recovery of other damages specified in the Contract Documents.

ARTICLE 5. COMPONENT PARTS OF THE CONTRACT. The "Contract Documents" include the following:

- Notice Inviting Bids
- Instructions to Bidders
- Bid Form
- Certification of Division of Industrial Relations Registration
- Contractor's Certificate Regarding Workers' Compensation
- Bid Security
- Designation of Subcontractors
- Information Required of Bidders (List of Current and Completed Projects)
- Asbestos Free Materials Certifications
- Recycled Content Certification

Fingerprinting Requirement Certification (if applicable)
 Statement Regarding A Drug-Free Workplace
 Non-Collusion Declaration
 Iran Contracting Act Certification (if applicable)
 Contract
 Performance Bond
 Payment Bond
 General Conditions
 Special Conditions
 Technical Specifications (as applicable)
 Addenda
 Plans and Drawings (as applicable)
 Approved and fully executed change orders
 Any other documents contained in or incorporated into the Contract

The Contactor shall complete the Work in strict accordance with all of the Contract Documents. All of the Contract Documents are intended to be complementary. Work required by one of the Contract Documents and not by others shall be done as if required by all. This Contract shall supersede any prior agreement of the parties.

ARTICLE 6. PROVISIONS REQUIRED BY LAW. Each and every provision of law required to be included in these Contract Documents shall be deemed to be included in these Contract Documents. The Contractor shall comply with all requirements of the California Labor Code applicable to this Project.

ARTICLE 7. INDEMNIFICATION. Contractor shall provide indemnification as set forth in the General Conditions.

ARTICLE 8. PREVAILING WAGES. Contractor shall be required to pay the prevailing rate of wages in accordance with the labor Code which such rates may be obtained online at <http://www.dir.ca.gov/dlsr>. and which must be posted at the job site.

IN WITNESS WHEREOF, this Contract has been duly executed by the above-named parties, on the day and year above written.

<p><u>NAME OF CONTRACTOR</u></p> <p>By _____ (signature)</p> <p>Name and Title: _____</p> <p>License No. _____</p>	<p><u>CAJON VALLEY UNION SCHOOL DISTRICT</u> By Governing Board:</p> <p>_____</p> <p>Jo Alegria</p> <p>_____</p> <p>James P. Miller</p> <p>_____</p> <p>Karen Clark-Mejia</p> <p>_____</p> <p>Tamara Otero</p> <p>_____</p> <p>Jill Barto</p>
--	---

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, **CAJON VALLEY UNION SCHOOL DISTRICT** (hereinafter referred to as "District") has awarded to _____, (hereinafter referred to as the "Contractor") an agreement for:

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

(hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Contractor is more particularly set forth in the Contract Documents for the Project (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Contractor is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, _____, the undersigned Contractor and _____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the District in the sum of _____ DOLLARS, (\$ _____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the District, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees including reasonable attorney's fees, incurred by District in enforcing such obligation.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by District, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by the District to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the District's option:

- (1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or
- (2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the District, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the District under the Contract and any modification thereto, less any amount previously paid by the District to the Contractor and any other set offs pursuant to the Contract Documents.
- (3) Permit the District to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the District under the Contract and any modification thereto, less any amount previously paid by the District to the Contractor and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the District may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Contractor.

Surety shall not utilize Contractor in completing the Project nor shall Surety accept a bid from Contractor for completion of the Project if the DISTRICT, when declaring the Contractor in default, notifies Surety of the District's objection to Contractor's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project.

[Remainder of Page Left Intentionally Blank.]

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____.

CONTRACTOR/PRINCIPAL

Name

By _____

SURETY:

By: _____
Attorney-In-Fact

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, \$_____.
(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of Agent or Representative for service of process in California, if different from above)

(Telephone number of Surety and Agent or Representative for service of process in California)

Fax number of Surety and Agent

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA

COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally appeared _____, who proved to me on the basis of satisfactory

evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

DESCRIPTION OF ATTACHED DOCUMENT

- ☐ Individual
☐ Corporate Officer

Title(s)

- ☐ Partner(s) ☐ Limited
 ☐ General

- ☐ Attorney-In-Fact
☐ Trustee(s)
☐ Guardian/Conservator
☐ Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

Title or Type of Document

Number of Pages

Date of Document

Signer(s) Other Than Named Above

NOTE: A copy of the Power-of-Attorney to local representatives of the bonding company must be attached hereto.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the **CAJON VALLEY UNION SCHOOL DISTRICT** (hereinafter designated as the "District"), by action taken or a resolution passed _____, **20**_____ has awarded to _____ hereinafter designated as the "Principal," a contract for the work described as follows:

**REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY**

(the "Project"); and WHEREAS, said Principal is required to furnish a bond in connection with said contract; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the District in the penal sum of _____ Dollars (\$_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, fail to pay for any materials, provisions or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, all litigation expenses incurred by the District in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond shall inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or attempted rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under

the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the owner or District and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 9100 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned, including but not limited to the provisions of sections 2819 and 2845 of the California Civil Code.

IN WITNESS WHEREOF, four (4) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____ 20____ the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

(Corporate Seal of Principal,
if corporation)

Principal (Property Name of Contractor)

By _____
(Signature of Contractor)

(Seal of Surety)

Surety

By _____
Attorney in Fact

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:
(Name and Address of Surety)

(Name and Address of Agent or
Representative for service of
process in California, if different
from above)

(Telephone number of Surety and
Agent or Representative for service
of process in California)

Fax number of Surety and Agent

(Attached Attorney-In-Fact
Certificate and Required
Acknowledgements)

***Note: Appropriate Notarial Acknowledgments of Execution by Contractor and +surety and a power of Attorney MUST BE ATTACHED.**

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GENERAL CONDITIONS

ARTICLE 1. DEFINITIONS

- a. Acceptable, Acceptance or words of similar import shall be understood to be the acceptance of the District Representative and/or the District .
- b. Act of God an Act of God is an earthquake of magnitude 3.5 on the Richter scale and tidal waves.
- c. Approval means written authorization by District Representative and/or District .
- d. Contract Documents includes all documents as stated in the Contract.
- e. Day shall mean calendar day unless otherwise specifically designated.
- f. District and Contractor are those stated in the Contract. The terms District and Owner may be used interchangeably.
- g. District Representative shall mean the DISTRICT'S REPRESENTATIVE FOR PURPOSES OF OVERSEEING CONSTRUCTION as listed in the Special Conditions, or his/her designee, acting either directly or through properly authorized agents, such as agents acting within the scope of the particular duties entrusted to them. Also sometimes referred to as the "District's Representative" or "Representative" in the Contract Documents.
- h. Equal, Equivalent, Satisfactory, Directed, Designated, Selected, As Required and similar words shall mean the written approval, selection, satisfaction, direction, or similar action of the District Representative and/or District.
- i. Indicated, Shown, Detailed, Noted, Scheduled or words of similar meaning shall mean that reference is made to the drawings, unless otherwise noted. It shall be understood that the direction, designation, selection, or similar import of the District Representative and/or District is intended, unless stated otherwise.
- j. Install means the complete installation of any item, equipment or material.
- k. Material shall include machinery, equipment, manufactured articles, or construction such as form work, fasteners, etc., and any other classes of material to be furnished in connection with the Contract. All materials shall be new unless specified otherwise.
- l. Perform shall mean that the Contractor, at Contractor's expense, shall take all actions necessary to complete The Work, including furnishing of necessary labor, tools, and equipment, and providing and installing Materials that are indicated, specified, or required to complete such performance.
- m. Project is The Work planned by District as provided in the Contract Documents.
- n. Provide shall include provide complete in place, that is furnish, install, test and make ready for use.
- o. Recyclable Waste Materials shall mean materials removed from the Project site which is required per local ordinances to be diverted to a recycling center rather than an area landfill. Recyclable Waste Materials include asphalt, concrete, brick, concrete block, and rock.

- p. Specifications means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the work. Except for Sections 1-9 of the Standard Specifications for Public Works Construction ("Greenbook"), current edition, which are specifically excluded from incorporation into these Contract Documents, the Work shall be done in accordance with the Greenbook, including all current supplements, addenda, and revisions thereof. In the case of conflict between the Greenbook and the Contract Documents, the Contract Documents shall prevail.
- q. The Work means the entire improvement planned by the District pursuant to the Contract Documents.
- r. Work means labor, equipment and materials incorporated in, or to be incorporated in the construction covered by the Contract Documents.

ARTICLE 2. CONTRACT DOCUMENTS

- a. **Contract Documents.** The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all.
- b. **Interpretations.** The Contract Documents are intended to be fully cooperative and to be complementary. If Contractor observes that any documents are in conflict, the Contractor shall promptly notify the District Representative in writing. In case of conflicts between the Contract Documents, the order of precedence shall be as follows:
 - 1. Change Orders or Work Change Directives
 - 2. Addenda
 - 3. Special Provisions (or Special Conditions)
 - 4. Technical Specifications
 - 5. Plans (Contract Drawings)
 - 6. Contract
 - 7. General Conditions
 - 8. Instructions to Bidders
 - 9. Notice Inviting Bids
 - 10. Contractor's Bid Forms
 - 11. Greenbook
 - 12. Standard Plans
 - 13. Reference Documents

With reference to the Drawings, the order of precedence shall be as follows:

- 1. Figures govern over scaled dimensions
 - 2. Detail drawings govern over general drawings
 - 3. Addenda or Change Order drawings govern over Contract Drawings
 - 4. Contract Drawings govern over Standard Drawings
 - 5. Contract Drawings govern over Shop Drawings
- c. **Conflicts in Contract Documents.** Notwithstanding the orders of precedence established above, in the event of conflicts, the higher standard shall always apply.
- d. **Organization of Contract Documents.** Organization of the Contract Documents into divisions, sections, and articles, and arrangement of drawings shall not control the Contractor in dividing

The Work among subcontractors or in establishing the extent of Work to be performed by any trade.

ARTICLE 3. CONTRACTS DOCUMENTS: COPIES & MAINTENANCE

Contractor will be furnished, free of charge, one (1) copy of the Contract Documents. Additional copies may be obtained at cost of reproduction.

Contractor shall maintain a clean, undamaged set of Contract Documents at the Project site.

ARTICLE 4. DETAIL DRAWINGS AND INSTRUCTIONS

- a. **Examination of Contract Documents.** Before commencing any portion of The Work, Contractor shall again carefully examine all applicable Contract Documents, the Project site and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify the District Representative of any potential error, inconsistency, ambiguity, conflict or lack of detail or explanation. If Contractor performs, permits, or causes the performance of any Work which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction. In no case shall the Contractor or any subcontractor proceed with Work if uncertain as to the applicable requirements.
- b. **Additional Instructions.** After notification of any error, inconsistency, ambiguity, conflict or lack of detail or explanation, the District Representative will provide any required additional instructions, by means of drawings or other written direction, necessary for proper execution of Work.
- c. **Quality of Parts, Construction and Finish.** All parts of The Work shall be of the best quality of their respective kinds and the Contractor must use all diligence to inform itself fully as to the required construction and finish. In no case shall Contractor proceed with The Work without obtaining first from the District Representative such Approval may be necessary for the proper performance of Work.
- d. **Contractor's Variation from Contract Document Requirements.** If it is found that the Contractor has varied from the requirements of the Contract Documents including the requirement to comply with all applicable laws, ordinances, rules and regulations, the District Representative may at any time, before or after completion of the Work, order the improper Work removed, remade or replaced by the Contractor at the Contractor's expense.

ARTICLE 5. EXISTENCE OF UTILITIES AT THE WORK SITE

- a. The District has endeavored to determine the existence of utilities at the Project site from the records of the owners of known utilities in the vicinity of the Project. The positions of these utilities as derived from such records are shown on the Plans.
- b. No excavations were made to verify the locations shown for underground utilities. The service connections to these utilities are not shown on the plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make its own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing Work which could result in damage to such utilities. The Contractor shall immediately notify the District in writing of any utility discovered in a different position than shown on the Plans or which is not shown on the Plans.
- c. All water meters, water valves, fire hydrants, electrical utility vaults, telephone vaults, gas utility valves, and other subsurface structures shall be relocated or adjusted to final grade by the

Contractor. Locations of existing utilities shown on the Plans are approximate and may not be complete. The Contractor shall be responsible for coordinating its Work with all utility companies during the construction of The Work.

- d. Notwithstanding the above, pursuant to Section 4215 of the Government Code, the District has the responsibility to identify, with reasonable accuracy, main or trunkline facilities on the plans and specifications. In the event that main or trunkline utility facilities are not identified with reasonable accuracy in the plans and specifications made a part of the invitation for bids, District shall assume the responsibility for their timely removal, relocation, or protection.
- e. Contractor, except in an emergency, shall contact the appropriate regional notification center, Southern California Underground Service Alert at 1-800-227-2600 at least two working days prior to commencing any excavation if the excavation will be performed in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced or carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any subcontractor of the Contractor and the District has been given the identification number by the Contractor.

ARTICLE 6. SCHEDULE

- a. **Estimated Schedule.** Within fourteen (14) days after the issuance of the Notice to Proceed, Contractor shall prepare a Project schedule and shall submit this to the District Representative for Approval. The receipt or Approval of any schedules by the District Representative or the District shall not in any way relieve the Contractor of its obligations under the Contract Documents. The Contractor is fully responsible to determine and provide for any and all staffing and resources at levels which allow for good quality and timely completion of the Project. Contractor's failure to incorporate all elements of Work required for the performance of the Contract or any inaccuracy in the schedule shall not excuse the Contractor from performing all Work required for a completed Project within the specified Contract time period. If the required schedule is not received by the time the first payment under the Contract is due, Contractor shall not be paid until the schedule is received, reviewed and accepted by the District Representative.
- b. **Schedule Contents.** The schedule shall allow enough time for inclement weather. The schedule shall indicate the beginning and completion dates of all phases of construction; critical path for all critical, sequential time related activities; and "float time" for all "slack" or "gaps" in the non-critical activities. The schedule shall clearly identify all staffing and other resources which in the Contractor's judgment are needed to complete the Project within the time specified for completion. Schedule duration shall match the Contract time. Schedules indicating early completion will be rejected.
- c. **Schedule Updates.** Contractor shall continuously update its construction schedule. Contractor shall submit an updated and accurate construction schedule to the District Representative whenever requested to do so by District Representative and with each progress payment request. The District Representative may withhold progress payments or other amounts due under the Contract Documents if Contractor fails to submit an updated and accurate construction schedule.

ARTICLE 7. SUBSTITUTIONS

- a. **One Product Specified.** Unless the Specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words "or equal." Pursuant to Article 22c below, the Contractor

may, unless otherwise stated, offer any material, process, article, etc. which shall be materially equal or better in every respect to that so indicated or specified ("Specified Item") and will complete accomplish the purpose of the Contract Documents. Please note, however, that based on the District's RESOLUTION ADOPTING COMPATIBILITY, UNIFORMITY, AND STANDARDIZATION FOR PROPRIETARY BUILDING SYSTEM COMPONENTS, Resolution #11 17-1116 DM, substitution requests will not be accepted for the following

- | | |
|---|--|
| 1. Security System | Manufacturer (Radionics or DMP) |
| 2. Intercom System | Manufacturer (Bogen) |
| 3. District Computer Networking System: | Manufacturer (Cisco Switches and Routers, AMP Netconnect (Tyco Electronics) Cable, Connectors, Connecting Hardware (Items Listed in the AMP Netconnect Warranted Systems List), HP Servers, HP LaserJet Printers, APC Server Racks and Uninterruptible Power Supplies) |
| 4. District Voice over IP (VoIP) Phone System | Manufacturer (Cisco Switches, Routers, Call-Manager, Phones, Voice Mail, Gateway) |
| 5. Surveillance Camera and Management System | Manufacturer (Cisco Systems) |
| 6. Door Locks, Keying and Hardware System | Manufacturer (Best) |
| 7. Energy Management System | Manufacturer (Trane) |
| 8. HVAC System | Manufacturer (Trane) |
- b. Products Specified Which are Commercially Unavailable. If the Contractor fails to make a request for substitutions for products, prior to the submission of its bid, and such products subsequently become commercially unavailable, the Contractor may request a substitution for such commercially unavailable item. The decision to grant this request is solely at the District's discretion. The written approval of the District, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. The District may condition its approval of the substitution upon the delivery to District of an extended warranty or other assurances of adequate performance of the substitution as well as an equitable deduction in the contract price should the substituted item cost less than the Specified item. All risks of delay due the approval of a requested substitution by the DSA, or any other governmental agency having jurisdiction, shall be on the requesting party. All additional costs, all procurement and construction delays, and all costs for review by the Architect or its consultants shall be the responsibility of the Contractor and will be deducted from Contractor's pay request.
- c. Substitution Request Form. Requests for substitutions of products, materials, or processes in place of a Specified Item must be in writing on the District's Substitution Request Form ("Request Form") no later than 5 business days prior to the bid opening (as per the deadline shown in the Special Conditions), except as provided for in Article 7b above. The Request Form must be accompanied by evidence as to whether the proposed substitution:
1. Is equal in quality, service, and ability to the Specified Item;
 2. Will entail no changes in detail, construction, and scheduling of related work;
 3. Will be acceptable in consideration of the required design and artistic effect;
 4. Will provide no cost disadvantage to the District

- 5 Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
 - 6 Will require no change in the construction schedule.
- d. Bidder agrees that in the event its substitution request is denied, it will provide the initially specified item.
 - e. Bidder shall provide any and all Drawing, Specifications, samples, performance data, calculations, and other information, as may be required to assist the Architect and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.
 - f. After the District's receipt of such evidence by the bidder, the District will make its final decision as to whether the bidder's request for substitution for any Specified Items will be granted. The decision as to whether a proposed request for substitution is equal to a Specified Item shall be at the sole discretion of the District. Any request for substitution that is granted by the District shall be documented and processed through a Change Order. The District may condition its approval of any substitution upon delivery to the District of any extended warranty or other assurances of adequate performance of the substitution. Any and all risks of delay due to approval by the DSA or any other governmental agency having jurisdiction shall be on the bidder.
 - g. If the Architect and District accept a proposed substitution, the Contract agrees to pay for all engineering and design services, including, without limitation, compensation to the Architect and affected engineers for their required time to process such substitution through DSA, if required, and to make all changes and adjustments in materials or to the work of all trades directly or indirectly affected by the substituted item or items at no cost to the District.
 - h. List of Manufacturers and Products Required. The Contractors shall require all Subcontractors to prepare and submit to the Contractor, within (30) days of execution of the Subcontract, comprehensive lists, in quadruplicate, of the manufacturers and products proposed for the Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for the Contractor's or Architect's approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, required by the Contract Documents, but rather shall be considered as a base from which more detailed submittals shall be developed for final review by the Contractor and the Architect.

SUBSTITUTION REQUEST FORM

Pursuant to Public Contract Code Section 3400, bidder hereby requests substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction.

SUBMIT TO PURCHASING DEPARTMENT, BID ADMINISTRATOR

- a. The bidder may request a substitution. The substitution form must be received no later than the deadline shown in the Special Conditions with the District response to be issued via addendum, prior to bid opening.

THIS PAGE MUST BE COMPLETED IF A SUBSTITUTION IS REQUESTED

****If this form is not pre-approved or not included with the bid package, it will be the District's conclusion that the contractor intends to use all products as specified in the bid package and/or plans and all bid prices reflect this intent.**

	Specified Item	Requested Substituted Item	District Decision Circle One
1			Grant Deny
2			Grant Deny
3			Grant Deny
4			Grant Deny
5			Grant Deny
6			Grant Deny
7			Grant Deny

The Request Form must be accompanied by evidence as to whether the proposed substitution (1) is equal in quality, service, and ability to the Specified Item; (2) will entail no change in detail, construction, and scheduling of related work; (3) will be acceptable in consideration of the required design and artistic effect; (4) will provide no cost disadvantage to the District; (5) will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and (6) will require no change of the construction schedule.

The undersigned states that the following paragraph, unless modified on attachments, are correct:

1. The proposed substitution does not affect the dimensions shown on the Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be available locally for the proposed substitution.

Bid # _____

Bid Title: _____

Name of Bidder: _____

By: _____

Phone Number: _____

Fax Number: _____

E-Mail: _____

District Signature: _____

Printed Name & Title _____

Phone Number: _____

This page must be completed, submitted by the Substitution Request Deadline, pre-approved and returned with bid if a substitution is requested.

If this pre-approved form is not included with the bid package, it will be the District's conclusion that the contractor intends to use all products as specified in the bid package and/or plans and all bid prices reflect this intent.

ARTICLE 8. SHOP DRAWINGS

- a. Contractor shall check and verify all field measurements and shall submit with such promptness as to provide adequate time for review and cause no delay in his own Work or in that of any other contractor, subcontractor, or worker on the Project, six (6) copies of all shop or setting drawings, calculations, schedules, and materials list, and all other provisions required by the Contract. Contractor shall sign all submittals affirming that submittals have been reviewed and approved by Contractor prior to submission to District Representative. Each signed submittal shall affirm that the submittal meets all the requirements of the Contract Documents except as specifically and clearly noted and listed on the cover sheet of the submittal.
- b. Contractor shall make any corrections required by the District Representative, and file with the District Representative six (6) corrected copies each, and furnish such other copies as may be needed for completion of the Work. District Representative's approval of shop drawings shall not relieve Contractor from responsibility for deviations from the Contract Documents unless Contractor has, in writing, called District Representative's attention to such deviations at time of submission and has secured the District Representative's written Approval. District Representative's Approval of shop drawings shall not relieve Contractor from responsibility for errors in shop drawings.

ARTICLE 9. SUBMITTALS

- a. Contractor shall furnish to the District Representative for approval, prior to purchasing or commencing any Work, a log of all samples, material lists and certifications, mix designs, schedules, and other submittals, as required in the specifications. The log shall indicate whether samples will be provided in accordance with other provisions of this Contract.
- b. Contractor will provide samples and submittals, together with catalogs and supporting data required by the District Representative, to the District Representative within a reasonable time period to provide for adequate review and avoid delays in the Work.
- c. These requirements shall not authorize any extension of time for performance of this Contract. District Representative will check and approve such samples, but only for conformance with design concept of work and for compliance with information given in the Contract Documents. Work shall be in accordance with approved samples and submittals.

ARTICLE 10. MATERIALS

- a. Except as otherwise specifically stated in the Contract Documents, Contractor shall provide and pay for all materials, labor, tools, equipment, water, lights, power, transportation, superintendence, temporary constructions of every nature, and all other services and facilities of every nature whatsoever necessary to execute and complete this Contract within specified time.
- b. Unless otherwise specified, all materials shall be new and the best of their respective kinds and grades as noted and/or specified, and workmanship shall be of good quality.
- c. Materials shall be furnished in ample quantities and at such times as to ensure uninterrupted progress of The Work and shall be stored properly and protected as required by the Contract Documents. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or Work.
- d. No materials, supplies, or equipment for Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein

or in any part thereof is retained by the seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the Project, to the District free from any claims, liens, or charges.

- e. Materials shall be stored on the Project site in such manner so as not to interfere with any operations of the District or any independent contractor.

ARTICLE 11. CONTRACTOR'S SUPERVISION

Contractor shall continuously keep at the Project site, a competent and experienced full-time Project superintendent approved by the District. Superintendent must be able to proficiently speak, read and write in English. Contractor shall continuously provide efficient supervision of the Project.

ARTICLE 12. WORKERS

- a. Contractor shall at all times enforce strict discipline and good order among its employees. Contractor shall not employ on the Project any unfit person or any one not skilled in the Work assigned to him or her.
- b. Any person in the employ of the Contractor whom the District may deem incompetent or unfit shall be dismissed from The Work and shall not be employed on this Project except with the written Approval of the District.

ARTICLE 13. FINGERPRINTING REQUIREMENTS (NOT REQUIRED FOR THIS PROJECT)

District Determination of Fingerprinting Requirement Application is set forth in the Special Conditions.

- a. Contracts For Construction, Reconstruction, Rehabilitation Or Repair Of A School Facility Involving More Than Limited Contact With Students.

If the District determines, based on the totality of the circumstances concerning the Project, that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have contact other than limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation, or repair of a school facility where the Contractor and/or Contractor's employees will have more than limited contact with students and the services to be provided do not constitute an emergency or exceptional situation. In accordance with Education Code section 45125.2 the Contractor shall, at Contractor's own expense, (a) install a physical barrier to limit contact with students by Contractor and/or Contractor's employees, or **(b) provide for the continuous supervision and monitoring of the Contractor and/or Contractor's employees by an employee of the Contractor who has received fingerprint clearance from the California Department of Justice**, or (c) provide for the surveillance of the Contractor and Contractor's employees by a District employee.

- b. Contracts For Construction, Reconstruction Rehabilitation Or Repair Of A School Facility Involving Only Limited Contact With Students.

If the District determines based on the totality of the circumstances concerning the Project that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have only limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation or repair of a school facility involving only limited contact with students. Accordingly, the parties agree that the following conditions apply to any work performed by the Contractor and/or Contractor's employees on a school site: (1) Contractor and/or Contractor's employees shall check in with

the school office each day immediately upon arriving at the school site; (2) Contractor and/or Contractor's employees shall inform school office staff of their proposed activities and location at the school site; (3) Once at such location Contractor and/or Contractor's employees shall not change locations without contacting the school office; (4) Contractor and Contractor's employees shall not use student restroom facilities; and (5) If Contractor and/or Contractor's employees find themselves alone with a student, Contractor and Contractor's employees shall immediately contact the school office and request that a member of the school staff be assigned to the work location.

ARTICLE 14. SUBCONTRACTORS

- a. Contractor agrees to bind every subcontractor to the terms of the Contract Documents as far as such terms are applicable to subcontractor's portion of The Work. Contractor shall be as fully responsible to the District for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by its subcontractors, as Contractor is for acts and omissions of persons directly employed by Contractor. Nothing contained in these Contract Documents shall create any contractual relationship between any subcontractor and the District.
- b. The District reserves the right to Approve all subcontractors. The District's Approval of any subcontractor under this Contract shall not in any way relieve Contractor of its obligations in the Contract Documents.
- c. Prior to substituting any subcontractor listed in the Bid Forms, Contractor must comply with the requirements of the Subletting and Subcontracting Fair Practices Act pursuant to California Public Contract Code section 4100 et seq.

ARTICLE 15. PERMITS AND LICENSES

Permits and licenses necessary for prosecution of The Work shall be secured and paid for by Contractor, unless otherwise specified in the Contract Documents.

- a. Contractor shall obtain and pay for all other permits and licenses required for The Work, including excavation permit and for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under jurisdiction of public agencies other than the District.
- b. The Contractor shall arrange and pay for all off-site inspection of the Work related to permits and licenses, including certification, required by the specifications, drawings, or by governing authorities, except for such off-site inspections delineated as the District's responsibility pursuant to the Contract Documents.
- c. Before Acceptance of the Project, the Contractor shall submit all licenses, permits, certificates of inspection and required approvals to the District.

ARTICLE 16. UTILITY USAGE

- a. All temporary utilities, including but not limited to electricity, water, gas, and telephone, used on the Work shall be furnished and paid for by Contractor. Contractor shall Provide necessary temporary distribution systems, including meters, if necessary, from distribution points to points on The Work where the utility is needed. Upon completion of The Work, Contractor shall remove all temporary distribution systems.
- b. Contractor shall provide necessary and adequate utilities and pay all costs for water, electricity, gas, oil, and sewer charges required for completion of the Project.
- c. All permanent meters Installed shall be listed in the Contractor's name until Project Acceptance.

- d. If the Contract is for construction in existing facilities, Contractor may, with prior written Approval of the District, use the District's existing utilities by compensating the District for utilities used by Contractor.

ARTICLE 17. INSPECTION FEES FOR PERMANENT UTILITIES

All inspection fees and other municipal charges for permanent utilities including, but not limited to, sewer, electrical, phone, gas, water, and irrigation shall be paid for by the District. Contractor shall be responsible for arranging the payment of such fees, but inspection fees and other municipal fees relating to permanent utilities shall be paid by the District. Contractor may either request reimbursement from the District for such fees, or shall be responsible for arranging and coordination with District for the payment of such fees.

ARTICLE 18. TRENCHES

- a. Trenches Five Feet or More in Depth. The Contractor shall submit to the District, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches five feet or more in depth. If the plan varies from shoring system standards, the plan shall be prepared by a registered civil or structural engineer. The plan shall not be less effective than the shoring, bracing, sloping, or other provisions of the Construction Safety Orders, as defined in the California Code of Regulations.
- b. Excavations Deeper than Four Feet. If work under this Contract involves digging trenches or other excavation that extends deeper than four feet below the surface, Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:
- 1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.
 - 2) Subsurface or latent physical conditions at the site differing from those indicated.
 - 3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

The District shall promptly investigate the conditions, and if it finds that the conditions do so materially differ, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of The Work, shall issue a change order under the procedures described in the Contract Documents.

In the event that a dispute arises between the District and the Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of The Work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the parties.

ARTICLE 19. REMOVAL OF HAZARDOUS MATERIALS

Should Contractor encounter material reasonably believed to be polychlorinated biphenyl (PCB) or other toxic wastes and hazardous materials which have not been rendered harmless at the Project site, the Contractor shall immediately stop work at the affected Project site and shall report the condition to the

District in writing. The District shall contract for any services required to directly remove and/or abate PCBs and other toxic wastes and hazardous materials, if required by the Project site(s), and shall not require the Contractor to subcontract for such services. The Work in the affected area shall not thereafter be resumed except by written agreement of the District and Contractor.

ARTICLE 20. SANITARY FACILITIES

Contractor shall provide sanitary temporary toilet buildings for the use of all workers. All toilets shall comply with local codes and ordinances. Toilets shall be kept supplied with toilet paper and shall have workable door fasteners. Toilets shall be serviced no less than once weekly and shall be present in a quantity of not less than 1 per 20 workers as required by CAL-OSHA regulation. The toilets shall be maintained in a sanitary condition at all times. Use of toilet facilities in The Work under construction shall not be permitted. Any other Sanitary Facilities required by CAL-OSHA shall be the responsibility of the Contractor.

ARTICLE 21. AIR POLLUTION CONTROL

Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes. All containers of paint, thinner, curing compound, solvent or liquid asphalt shall be labeled to indicate that the contents fully comply with the applicable material requirements.

ARTICLE 22. COMPLIANCE WITH STATE STORM WATER PERMIT

- a. Contractor shall be required to comply with all conditions of the State Water Resources Control Board ("State Water Board") National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity ("Permit") for all construction activity which results in the disturbance of in excess of one acre of total land area or which is part of a larger common area of development or sale. Owner shall be responsible for filing the Notice of Intent and for obtaining the Permit. Contractor shall be solely responsible for preparing and implementing a Storm Water Pollution Prevention Plan ("SWPPP") prior to initiating Work. In bidding on this Contract, it shall be Contractor's responsibility to evaluate the cost of procuring the Permit and preparing the SWPPP as well as complying with the SWPPP and any necessary revision to the SWPPP. Contractor shall comply with all requirements of the State Water Resources Control Board. Contractor shall include all costs of compliance with specified requirements in the Contract amount.
- b. Contractor shall be responsible for procuring, implementing and complying with the provisions of the Permit and the SWPPP, including the standard provisions, monitoring and reporting requirements as required by the Permit. Contractor shall provide copies of all reports and monitoring information to the District Representative.
- c. Contractor shall comply with the lawful requirements of any applicable municipality, the District, drainage district, and other local agencies regarding discharges of storm water to separate storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.
- d. Storm, surface, nuisance, or other waters may be encountered at various times during construction of The Work. Therefore, the Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.
- e. Failure to comply with the Permit is in violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless District, its officials, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which District, its officials, officers, agents, employees and authorized volunteers

may sustain or incur for noncompliance with the Permit arising out of or in connection with the Project, except for liability resulting from the sole established negligence, willful misconduct or active negligence of the District, its officials, officers, agents, employees or authorized volunteers. District may seek damages from Contractor for delay in completing the Contract in accordance with the Contract Documents, caused by Contractor's failure to comply with the Permit.

ARTICLE 23. CLEANING UP

- a. Contractor at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment. Contractor shall not store debris under, in, or about the premises. Upon completion of Work, Contractor shall clean the interior and exterior of the building or improvement including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected so surfaces are free from foreign material or discoloration. Contractor shall clean and polish all glass, plumbing fixtures, and finish hardware and similar finish surfaces and equipment and contractor shall also remove temporary Flooring, barricades, planking and construction toilet and similar temporary facilities from site. Contractor shall also clean all buildings, asphalt and concrete areas to the degree necessary to remove oil, grease, fuel, or other stains caused by Contractor operations or equipment.
- b. Contractor shall fully clean up the site at the completion of The Work. If the Contractor fails to immediately clean up at the completion of The Work, the District may do so and the cost of such clean up shall be charged back to the Contractor.

ARTICLE 24. LAYOUT AND FIELD ENGINEERING

All field engineering required for laying out The Work and establishing grades for earthwork operations shall be furnished by the Contractor at its expense. Layout shall be done by a registered civil engineer Approved by the District Representative. Any required "as-built" drawings of the Work shall be prepared by the registered civil engineer.

ARTICLE 25. EXCESSIVE NOISE

- a. The Contractor shall use only such equipment on the work and in such state of repair so that the emission of sound therefrom is within the noise tolerance level of that equipment as established by CAL-OSHA.
- b. The Contractor shall comply with the most restrictive of the following: (1) local sound control and noise level rules, regulations and ordinances and (2) the requirements contained in these Contract Documents, including hours of operation requirements. No internal combustion engine shall be operated on the Project without a muffler of the type recommended by the manufacturer. Should any muffler or other control device sustain damage or be determined to be ineffective or defective, the Contractor shall promptly remove the equipment and shall not return said equipment to the job until the device is repaired or replaced. Said noise and vibration level requirements shall apply to all equipment on the job or related to the job, including but not limited to, trucks, transit mixers or transit equipment that may or may not be owned by the Contractor.

ARTICLE 26. TESTS AND INSPECTIONS

- a. If the Contract Documents, the District Representative, or any instructions, laws, ordinances, or public authority require any part of The Work to be tested or Approved, Contractor shall provide the District Representative at least two (2) working days notice of its readiness for observation or inspection. If inspection is by a public authority other than the District, Contractor shall promptly inform the District of the date fixed for such inspection. Required certificates of inspection (or similar) shall be secured by Contractor. Costs for District testing and District inspection shall be

paid by the District. Costs of tests for Work found not to be in compliance shall be paid by the Contractor.

- b. If any Work is done or covered up without the required testing or approval, the Contractor shall uncover or deconstruct the Work, and the Work shall be redone after completion of the testing at the Contractor's cost in compliance with the Contract Documents.
- c. Where inspection and testing are to be conducted by an independent laboratory or agency, materials or samples of materials to be inspected or tested shall be selected by such laboratory or agency, or by the District, and not by Contractor. All tests or inspections of materials shall be made in accordance with the commonly recognized standards of national organizations.
- d. In advance of manufacture of materials to be supplied by Contractor which must be tested or inspected, Contractor shall notify the District so that the District may arrange for testing at the source of supply. Any materials which have not satisfactorily passed such testing and inspection shall not be incorporated into The Work.
- e. If the manufacture of materials to be inspected or tested will occur in a plant or location outside the geographic limits of District, the Contractor shall pay for any excessive or unusual costs associated with such testing or inspection, including but not limited to excessive travel time, standby time and required lodging.
- f. Reexamination of Work may be ordered by the District. If so ordered, Work must be uncovered or deconstructed by Contractor. If Work is found to be in accordance with the Contract Documents, the District shall pay the costs of reexamination and reconstruction. If such work is found not to be in accordance with the Contract Documents, Contractor shall pay all costs.

ARTICLE 27. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall be responsible for all damages to persons or property that occur as a result of The Work. Contractor shall be responsible for the proper care and protection of all materials delivered and Work performed until completion and final Acceptance by the District. All Work shall be solely at the Contractor's risk. Contractor shall adequately protect adjacent property from settlement or loss of lateral support as necessary. Contractor shall comply with all applicable safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the Project site where Work is being performed. Contractor shall erect and properly maintain at all times, as required by field conditions and progress of work, all necessary safeguards, signs, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created in the course of construction.
- b. In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization from the District Representative, is hereby permitted to act to prevent such threatened loss or injury; and Contractor shall so act, without appeal, if so authorized or instructed by the District Representative or the District. Any compensation claimed by Contractor on account of emergency work shall be determined by and agreed upon by the District and the Contractor.
- c. Contractor shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions.
- d. Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, and other adjoining property and structures, and to avoid damage thereto, and Contractor shall repair any damage thereto caused by The Work operations. Contractor shall:

- 1) Enclose working area with a substantial barricade, and arrange work to cause minimum amount of inconvenience and danger to the public.
- 2) Provide substantial barricades around any shrubs or trees indicated to be preserved.
- 3) Deliver materials to the Project site over a route designated by the District Representative.
- 4) Provide any and all dust control required and follow the Applicable air quality regulations as appropriate. If the Contractor does not comply, the District shall have the immediate authority to provide dust control and deduct the cost from payments to the Contractor.
- 5) Confine Contractor's apparatus, the storage of materials, and the operations of its workers to limits required by law, ordinances, permits, or directions of the District Representative. Contractor shall not unreasonably encumber the Project site with its materials.
- 6) Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved civil engineer or land surveyor, at no cost to the District.

ARTICLE 28. CONTRACTORS MEANS AND METHODS

Contractor is solely responsible for the means and methods utilized to Perform The Work. In no case shall the Contractor's means and methods deviate from commonly used industry standards.

ARTICLE 29. AUTHORIZED REPRESENTATIVES

The District shall designate representatives, who shall have the right to be present at the Project site at all times. The District may designate an inspector who shall have the right to observe all of the Contractor's Work. The inspector is not authorized to make changes in the Contract Documents. The inspector shall not be responsible for the Contractor's failure to carry out The Work in accordance with the Contract Documents. Contractor shall provide safe and proper facilities for such access.

ARTICLE 30. HOURS OF WORK

- a. Eight (8) hours of work shall constitute a legal day's work. The Contractor and each subcontractor shall forfeit, as penalty to the District, twenty-five dollars (\$25) for each worker employed in the execution of Work by the Contractor or any subcontractor for each day during which such worker is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, except as provided in Labor Code Section 1815.
- b. Work shall be accomplished on a regularly scheduled eight (8) hour per day work shift basis, Monday through Friday, in compliance with local noise ordinances.
- c. Any person to operate, permit, use, or cause to operate any of the following at the Project site, Monday through Friday must be in compliance with local noise ordinances, with no Work allowed on District-observed holidays, unless pre-approved by the District Representative:
 - 1) Powered Vehicles
 - 2) Construction Equipment

- 3) Loading and Unloading Vehicles
- 4) Domestic Power Tool

ARTICLE 31. PAYROLL RECORDS

- a. Pursuant to Labor Code Section 1776, the Contractor and each subcontractor shall maintain weekly certified payroll records showing the name, address, social security number, work classification, straight time and overtime hours paid each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the work. Contractor shall certify under penalty of perjury that records maintained and submitted by Contractor are true and accurate. Contractor shall also require subcontractor(s) to certify weekly payroll records under penalty of perjury.
- b. The payroll records described herein shall be certified and submitted by the Contractor at a time designated by the District. The Contractor shall also provide the following:
 - 1) A certified copy of the employee's payroll records shall be made available for inspection or furnished to such employee or his or her authorized representative on request.
 - 2) A certified copy of all payroll records described herein shall be made available for inspection or furnished upon request of the Department of Industrial Relations ("DIR").
- c. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") of the DIR or shall contain the same information as the forms provided by the DLSE.
- d. Any copy of records made available for inspection and furnished upon request to the public shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the Contractor or any subcontractor shall not be marked or obliterated.
- e. In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying any item or actions necessary to ensure compliance with this section. Should noncompliance still be evident after such ten (10) day period, the Contractor shall, as a penalty to the District, forfeit Twenty-five Dollars (\$25.00) for each day, or portion thereof, for each worker until strict compliance is effectuated. Upon the request of the DIR, such penalties shall be withheld from contract payments.

ARTICLE 32. PREVAILING RATES OF WAGES

- a. The Contractor is aware of the requirements of Labor Code Sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Project involves an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is \$1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this Agreement from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. Contractor shall defend, indemnify and hold the District, its elected officials,

officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Prevailing Wage Laws.

- b. The Contractor and each subcontractor shall forfeit as a penalty to the District not more than two hundred dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.
- c. Contractor shall post, at appropriate conspicuous points on the Project site, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.

ARTICLE 33. EMPLOYMENT OF APPRENTICES

The Contractor's attention is directed to the provisions of Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning employment of apprentices by the Contractor or any subcontractor. The Contractor shall obtain a certificate of apprenticeship before employing any apprentice pursuant to Section 1777.5, 1777.6, and 1777.7 of the Labor Code. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, the Administrator of Apprenticeships, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

ARTICLE 34. PUBLIC WORKS CONTRACTOR REGISTRATION

Pursuant to Labor Code sections 1725.5 and 1771.1, the Contractor and its subcontractors must be registered with the Department of Industrial Relations at the time of the bid. By entering into this Contract, Contractor represents that it is aware of the registration requirement and is currently registered with the DIR. Contractor shall maintain a current registration for the duration of the Project. Contractor shall further include the requirements of Labor Code sections 1725.5 and 1771.1 in any subcontract and ensure that all subcontractors are registered at the time this Contract is entered into and maintain registration for the duration of the Project.

ARTICLE 35. NONDISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY

Pursuant to Labor Code Section 1735 and other applicable provisions of law, the Contractor and its subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap on this Project. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.

ARTICLE 36. LABOR/EMPLOYMENT SAFETY

The Contractor shall maintain emergency first aid treatment for his employees which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.), and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4.

ARTICLE 37. WORKERS' COMPENSATION INSURANCE

The Contractor shall Provide, during the life of this Contract, workers' compensation insurance for all of the employees engaged in Work under this Contract, on or at the Project site, and, in case any of sublet Work, the Contractor shall require the subcontractor similarly to provide workers' compensation insurance

for all the latter's employees as prescribed by State law. Any class of employee or employees not covered by a subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in work under this Contract, on or at the Project site, is not protected under the Workers' Compensation Statutes, the Contractor shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected. The Contractor is required to secure payment of compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code. The Contractor shall file with the District certificates of his insurance protecting workers. Company or companies providing insurance coverage shall be acceptable to the District, if in the form and coverage as set forth in the Contract Documents.

ARTICLE 38. EMPLOYER'S LIABILITY INSURANCE

Contractor shall provide during the life of this Contract, Employer's Liability Insurance, including Occupational Disease, in the amount of, at least, one million dollars (\$1,000,000.00) per person per accident. Contractor shall provide District with a certificate of Employer's Liability Insurance. Such insurance shall comply with the provisions of the Contract Documents. The policy shall be endorsed, if applicable, to provide a Borrowed Servant/Alternate Employer Endorsement and contain a Waiver of Subrogation in favor of the District.

ARTICLE 39. COMMERCIAL GENERAL LIABILITY INSURANCE

- a. Contractor shall procure and maintain during the life of this Contract and for such other period as may be required herein, at its sole expense, Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products/completed operations if applicable, personal and advertising injury – which may arise from or out of Contractor's operations, use, and management of the Project site, or the performance of its obligations hereunder. Policy limits shall not be less than **\$2,000,000** per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
- b. Such policy shall comply with all the requirements of this Article. The limits set forth herein shall apply separately to each insured against whom claims are made or suits are brought, except with respect to the limits of liability. Further the limits set forth herein shall not be construed to relieve the Contractor from liability in excess of such coverage, nor shall it limit Contractor's indemnification obligations to the District, and shall not preclude the District from taking such other actions available to the District under other provisions of the Contract Documents or law.
- c. Contractor shall make certain that any and all subcontractors hired by Contractor are insured in accordance with this Contract. If any subcontractor's coverage does not comply with the foregoing provisions, Contractor shall indemnify and hold the District harmless from any damage, loss, cost, or expense, including attorneys' fees, incurred by the District as a result thereof.
- d. All general liability policies provided pursuant to the provisions of this Article shall comply with the provisions of the Contract Documents.
- e. All general liability policies shall be written to apply to all bodily injury, including death, property damage, personal injury, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, under-ground excavation, removal of lateral support, and other covered loss, however occasioned, occurring during the policy term, and shall specifically insure the performance by Contractor of that part of the indemnification contained in these General Conditions, relating to liability for injury to or death of persons and damage to property. If the coverage contains one or more aggregate limits, a minimum of 50% of any such aggregate limit must remain available at all times; if over 50% of any aggregate limit has been paid or reserved, the District may require additional coverage to be purchased by Contractor to

restore the required limits. Contractor may combine primary, umbrella, and as broad as possible excess liability coverage to achieve the total limits indicated above. Any umbrella or excess liability policy shall include the additional insured endorsement described in the Contract Documents.

ARTICLE 40. AUTOMOBILE LIABILITY INSURANCE

Contractor shall take out and maintain at all times during the term of this Contract Automobile Liability Insurance in the amount of, at least, one million dollars (\$1,000,000). Such insurance shall provide coverage for bodily injury and property damage including coverage for non-owned and hired vehicles, in a form and with insurance companies acceptable to the District. Such insurance shall comply with the provisions of Article 30 below.

ARTICLE 41. BUILDER'S RISK ["ALL RISK"]

- a. It is the Contractor's responsibility to maintain or cause to be maintained Builder's Risk ["All Risk"] extended coverage insurance on all work, material, equipment, appliances, tools, and structures which are a part of the Contract and subject to loss or damage by fire, and vandalism and malicious mischief, in an amount to cover 100% of the replacement cost. The District accepts no responsibility until the Contract is formally accepted by the Governing Board for the work. The Contractor is required to file with the District a certificate evidencing fire insurance coverage.
- b. Provide insurance coverage on completed value form, all-risk or special causes of loss coverage.
 - 1) Insurance policies shall be so conditioned as to cover the performance of any extra work performed under the Contract.
 - 2) Coverage shall include all materials stored on site and in transit.
 - 3) Coverage shall include Contractor's tools and equipment.
 - 4) Insurance shall include boiler, machinery and material hoist coverage.
- c. Such insurance shall comply with the provisions of the Contract Documents.

ARTICLE 42. FORM AND PROOF OF CARRIAGE OF INSURANCE

- a. Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California unless waived, in writing, by the District Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A:VIII. Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from the District. At the election of the District the Contractor shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.
- b. Contractor shall cause its insurance carrier(s) to furnish the District with either 1) a properly executed original Certificates(s) of Insurance and certified original copies of Endorsements effecting coverage as required herein, or 2) if requested to do so in writing by the District Risk Manager, provide original Certified copies of policies including all Endorsements and all attachments thereto, showing such insurance is in full force and effect. The District, its Directors and officers, employees, agents or representatives are named as Additional Insured's and Provide a Waiver of Subrogation in favor of those parties. Further, said Certificates(s) and policies of insurance shall contain the covenant of the insurance carrier(s) that shall provide no

less than thirty (30) days written notice be given to the District prior to any material modification or cancellation of such insurance. In the event of a material modification or cancellation of coverage, the District may terminate or Stop Work pursuant to the Contract Documents, unless the District receives, prior to such effective date, another properly executed original Certificate of Insurance and original copies of endorsements or certified original policies, including all endorsements and attachments thereto evidencing coverages set forth herein and the insurance required herein is in full force and effect. Contractor shall not take possession, or use the Project site, or commence operations under this Agreement until the District has been furnished original Certificate(s) of Insurance and certified original copies of Endorsements or policies of insurance including all Endorsements and any and all other attachments as required in this Section. The original Endorsements for each policy and the Certificate of Insurance shall be signed by an individual authorized by the insurance carrier to do so on its behalf.

- c. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the District's insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory.
- d. The District reserves the right to adjust the monetary limits of insurance coverage's during the term of this Contract including any extension thereof-if in the District's reasonable judgment, the amount or type of insurance carried by the Contractor becomes inadequate.
- e. Contractor shall pass down the insurance obligations contained herein to all tiers of sub-contractors working under this Contract.

ARTICLE 43. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- a. **Time for Completion/Liquidated Damages.** Work shall be commenced within ten (10) days of the date stated in the District's Notice to Proceed and shall be completed by Contractor in the time specified in the Contract Documents. The District is under no obligation to consider early completion of the Project; and the Contract completion date shall not be amended by the District's receipt or acceptance of the Contractor's proposed earlier completion date. Furthermore, Contractor shall not, under any circumstances, receive additional compensation from the District (including but not limited to indirect, general, administrative or other forms of overhead costs) for the period between the time of earlier completion proposed by the Contractor and the Contract completion date. If The Work is not completed as stated in the Contract Documents, it is understood that the District will suffer damage. In accordance with Government Code section 53069.85, being impractical and infeasible to determine the amount of actual damage, it is agreed that Contractor shall pay to the District as fixed and liquidated damages, and not as a penalty, the sum stipulated in the Contract for each day of delay until The Work is fully completed. Contractor and its surety shall be liable for any liquidated damages. Any money due or to become due the Contractor may be retained to cover liquidated damages.
- b. **Inclement Weather.** Contractor shall abide the District Representative's determination of what constitutes inclement weather. Time extensions for inclement weather shall only be granted when the Work stopped during inclement weather is on the critical path of the Project schedule.
- c. **Extension of Time.** Contractor shall not be charged liquidated damages because of any delays in completion of The Work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor (or its subcontractors or suppliers). Contractor shall within five (5) Days of identifying any such delay notify the District in writing of causes of delay. The District shall ascertain the facts and extent of delay and grant extension of time for completing The Work when, in its judgment, the facts justify such an extension. Time extensions to the Project shall be requested by the Contractor as they occur and without delay. No delay claims shall be permitted

unless the event or occurrence delays the completion of the Project beyond the Contract completion date.

- d. **No Damages for Reasonable Delay.** The District's liability to Contractor for delays for which the District is responsible shall be limited to only an extension of time unless such delays were unreasonable under the circumstances. In no case shall the District be liable for any costs which are borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and other ongoing costs. Damages caused by unreasonable District delay, including delays caused by items that are the responsibility of the District pursuant to Government Code section 4215, shall be based on actual costs only, no proportions or formulas shall be used to calculate any delay damages.

ARTICLE 44. COST BREAKDOWN AND PERIODIC ESTIMATES

Contractor shall furnish on forms Approved by the District:

- a. Within ten (10) Days of award of the Contract a detailed estimate giving a complete breakdown of the Contract price;
- b. A monthly itemized estimate of Work done for the purpose of making progress payments. In order for the District to consider and evaluate each progress payment application, the Contractor shall submit a detailed measurement of Work performed and a progress estimate of the value thereof before the tenth (10th) Day of the following month.
- c. Contractor shall submit, with each of its payment requests, an adjusted list of actual quantities, verified by the District Representative, for unit price items listed, if any, in the Bid Form.
- d. Following the District's Acceptance of the Work, the Contractor shall submit to the District a written statement of the final quantities of unit price items for inclusion in the final payment request.
- e. The District shall have the right to adjust any estimate of quantity and to subsequently correct any error made in any estimate for payment.

Contractor shall certify under penalty of perjury, that all cost breakdowns and periodic estimates accurately reflect the Work on the Project.

ARTICLE 45. MOBILIZATION

- a. When a bid item is included in the Bid Form for mobilization, the costs of Work in advance of construction operations and not directly attributable to any specific bid item will be included in the progress estimate ("Initial Mobilization"). When no bid item is provided for "Initial Mobilization," payment for such costs will be deemed to be included in the other items of The Work.
- b. Payment for Initial Mobilization based on the lump sum provided in the Bid Form, which shall constitute full compensation for all such Work. No payment for Initial Mobilization will be made until all of the listed items have been completed and substantiated to the satisfaction of the District Representative. The scope of the Work included under Initial Mobilization shall include, but shall not be limited to, the following principal items:
 - 1. Obtaining and paying for all bonds, insurance, and permits.
 - 2. Moving on to the Project site of all Contractor's plant and equipment required for first month's operations.

3. Installing temporary construction power, wiring, and lighting facilities.
4. Establishing fire protection system.
5. Developing and installing a construction water supply.
6. Providing and maintaining the field office trailers for the Contractor and the District Representative, complete, with all specified furnishings and utility services including telephones, telephone appurtenances, computer and printer, and copying machine.
7. Providing on-site communication facilities for the Owner and the District Representative, including telephones, radio pagers, and fax machines.
8. Providing on-site sanitary facilities and potable water facilities as specified per Cal-OSHA and these Contract Documents.
9. Furnishing, installing, and maintaining all storage buildings or sheds required for temporary storage of products, equipment, or materials that have not yet been installed in the Work. All such storage shall meet manufacturer's specified storage requirements, and the specific provisions of the specifications, including temperature and humidity control, if recommended by the manufacturer, and for all security.
10. Arranging for and erection of Contractor's work and storage yard.
11. Posting all OSHA required notices and establishment of safety programs per Cal-OSHA.
12. Full-time presence of Contractor's superintendent at the job site as required herein.
13. Submittal of Construction Schedule as required by the Contract Documents.

ARTICLE 46. PAYMENTS

- a. The District shall make monthly progress payments following receipt of undisputed and properly submitted payment requests. Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of Work performed up to the last day of the previous month, less the aggregate of previous payments.
- b. The Contractor shall, after the full completion of The Work, submit a final payment application. All prior progress estimates shall be subject to correction in the final estimate and payment.
- c. Unless otherwise required by law, the final payment of five percent (5%) of the value of the Work, if unencumbered, shall be paid no sooner than thirty (30) days after the date of recordation of the Notice of Completion.
- d. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the District arising from this Contract.
- e. Payments to the Contractor shall not be construed to be an acceptance of any defective work or improper materials, or to relieve the Contractor of its obligations under the Contract Documents.
- f. The Contractor shall submit with each payment request the Contractor's conditional waiver of lien for the entire amount covered by such payment request, as well as a valid unconditional waiver of lien from the Contractor and all subcontractors and materialmen for all work and materials included in any prior invoices. Waivers of lien shall be in the forms prescribed by California Civil Code Section 3262. Prior to final payment by the District, the Contractor shall submit a final

waiver of lien for the Contractor's work, together with releases of lien from any subcontractor or materialmen.

- g. If state funds are used for this project, prior to, and as a condition precedent for final payment, Contractor shall provide the Purchasing Department Bid Administrator with written documentation identifying the amount paid to Disabled Veteran Business Enterprises (DVBE), and shall submit the certification letter issued by the Office of Small Business Certification and Resources verifying the DVBE status of the subject subcontractors. This documentation is required regardless of whether DVBE subcontractors were utilized in the performance of the Contract.

ARTICLE 47. PAYMENTS WITHHELD AND BACK CHARGES

In addition to amounts which the District may retain under other provisions of the Contract Documents the District may withhold payments due to Contractor as may be necessary to cover:

- a. Stop Notice Claims.
- b. Defective work not remedied.
- c. Failure of Contractor to make proper payments to its subcontractors or suppliers.
- d. Completion of the Contract if there exists a reasonable doubt that the work can be completed for balance then unpaid.
- e. Damage to another contractor or third party.
- f. Amounts which may be due the District for claims against Contractor.
- g. Failure of Contractor to keep the record ("as-built") drawings up to date.
- h. Failure to provide updates on the construction schedule.
- i. Site clean up.
- j. Failure of the Contractor to comply with requirements of the Contract Documents.
- k. Liquidated damages.
- l. Legally permitted penalties.

Upon completion of the Contract, the District will reduce the final Contract amount to reflect costs charged to the Contractor, back charges or payments withheld pursuant to the Contract Documents.

ARTICLE 48. CHANGES AND EXTRA WORK

- a. **Changes in Work.** District, without invalidating contract, and as provided by law, may order extra work or make changes by altering, adding to, or deducting from work, the contract sum being adjusted accordingly. All such work shall be subject to prevailing wage rates and shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.
- b. In giving instructions, Contractor agrees that architect shall have authority to make minor changes in work, not involving change in cost, and not inconsistent with the purposes or approvals of the project. Otherwise, except in an emergency endangering life or property, no extra work or

change shall be made unless pursuant to a written order from District, and no claim for an addition to the contract sum shall be valid unless so ordered.

- c. **Unforeseen Conditions.** Contractor shall provide District with notice of unforeseen conditions immediately upon discovery of such conditions.

- d. Value of any such extra work, change, or deduction shall be determined at the discretion of District in one or more of the following ways:

1. By acceptable lump sum proposal from Contractor with itemization as required by District.
2. By unit prices contained in Contractor's original bid and incorporated in contract documents or fixed by subsequent agreement between District and Contractor.
3. By the cost of material and labor and a percentage for overhead and profit. The following form shall be followed as applicable for additions and deductions to contract:

EXTRA/
(CREDIT)

- (a) Material (attach itemized quantity and unit cost plus sales tax)

- (b) Labor (attach itemized hours and base rates from identified prevailing wage schedules)

- (c) General Liability and
Builder's Risk Insurance, Workers' Compensation
Insurance, Social Security, Pension and Unemployment
Taxes at actual and verified cost. **(Do not include this amount if OCIP is in place.)**

- (d) Subtotal

- (e) Subcontractor's overhead and
profit not to exceed **10%** of Item (d)

- (f) Subtotal

- (g) General Contractor's Overhead and
Profit, including extended home office
overhead, not to exceed **10%** of Item (d)

- (h) Subtotal

- (i) Bond Premium, not to exceed 1% of
Item (h)

- (j) Total

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- e. Regardless of whether the cost of the change order is determined pursuant to 1, 2, or 3, above, in addition to the cost of the material and labor for deleted items, Contractor shall credit back an appropriate and reasonable overhead mark-up and the bonding mark up for deleted items. In addition, in no circumstance shall contractor be entitled to subcontractor's overhead costs or mark-up where work is performed by Contractor's own forces.

- f. Should Contractor claim that any instruction, request, drawing, specification, action, condition, omission, default, or other situation (i) obligates the District to pay additional compensation to the Contractor; or (ii) obligates the District to grant an extension of time for the completion of the contract; or (iii) constitutes a waiver of any provision in the contract, CONTRACTOR SHALL NOTIFY THE DISTRICT, IN WRITING, OF SUCH CLAIM AS SOON AS POSSIBLE, BUT IN NO EVENT WITHIN MORE THAN FIVE (5) WORKING DAYS FROM THE DATE CONTRACTOR HAS ACTUAL OR CONSTRUCTIVE NOTICE OF THE CLAIM. CONTRACTOR SHALL ALSO PROVIDE DISTRICT WITH SUFFICIENT WRITTEN DOCUMENTATION SUPPORTING THE FACTUAL BASIS OF THE CLAIM. Contractor shall be required to certify under penalty of perjury the validity and accuracy of any claims submitted. The Contractor's failure to notify the District within such five (5) working day period shall be deemed a waiver and relinquishment of the claim against the District. If such notice be given within the specified time, the procedure for its consideration shall be as stated above in this article. In the event of a dispute as to any work to be performed, the District has the right to direct the Contractor to continue to proceed with work as directed, and the Contractor is obligated to continue performance of work and advise District of its concerns in writing in accordance with the provisions of this subsection f. The procedure for consideration shall be as stated above in this article.
- g. In the event a mutual agreement cannot be reached on the cost of a change order, Contractor and District agree that an industry estimating guide, such as an estimating guide published by Means, shall be used to determine the cost of a disputed change order item.
- h. All costs associated with the change are to be included in the change order proposal to the District. Costs may be in terms of time, money or both.

ARTICLE 49. OCCUPANCY

The District reserves the right to occupy or utilize any portion of The Work at any time before completion, and such occupancy or use shall not constitute Acceptance of any part of Work covered by this Contract. This use shall not relieve the Contractor of its responsibilities under the Contract.

ARTICLE 50. INDEMNIFICATION

Contractor shall defend (with counsel of District's choosing), indemnify and hold the District, its officials, officers, agents, employees, and representatives free and harmless from any and all claims, demands, causes of action, costs, expenses, liabilities, losses, damages or injuries, in law or equity, regardless of whether the allegations are false, fraudulent, or groundless, to property or persons, including wrongful death, to the extent arising out of or incident to any acts, omissions or willful misconduct of Contractor, its officials, officers, employees, agents, consultants and contractors arising out of or in connection with the performance of the Work or this Contract, including claims made by subcontractors for nonpayment, including without limitation the payment of all consequential damages and attorneys' fees and other related costs and expenses. Contractor shall defend, at Contractor's own cost, expense and risk, with counsel of District's choosing, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against District, its officials, officers, agents, employees and representatives. To the extent of its liability, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against District, its officials, officers, employees, agents, employees and representatives, in any such suit, action or other legal proceeding. Contractor shall reimburse District, its officials, officers, agents, employees and representatives for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code Section 2782.

ARTICLE 51. RECORD ("AS BUILT") DRAWINGS

- a. Contractor shall prepare and maintain a complete set of record drawings (herein referred to as "as-builts") and shall require each trade to prepare its own as-builts. The as-builts must show the entire site for each major trade, including but not limited to water, sewer, electrical, data, telephone, cable, fire alarm, gas and plumbing. Contractor shall mark the as-builts to show the actual installation where the installation varies from the Work as originally shown. Contractor shall mark whichever drawings are most capable of showing conditions fully and where shop drawings are used, Contractor must record a cross-reference at the corresponding location on the contract drawings. Contractor shall give particular attention to concealed elements that would be difficult to measure and record at a later date. Contractor shall use colors to distinguish variations in separate categories of The Work.
- b. Contractor shall note related change order numbers where applicable. Contractor shall organize as-builts into manageable sets, bound with durable paper cover sheets and shall print suitable title, dates and other identification on the cover of each set. Contractor to also provide an electronic version of the as-builts. The suitability of the as-builts will be determined by the District Representative.

ARTICLE 52. RESOLUTION OF CONSTRUCTION CLAIMS

- a. All public works claims between the Contractor and the District shall be resolved pursuant to the procedures set forth in Public Contract Code section 9204. All public works claims of \$375,000 or less which arise between the Contractor and District shall be resolved in accordance with Public Contract Code sections 20104 et seq. and other applicable law, unless District has elected to resolve the dispute pursuant to Public Contract Code Section 10240 et seq.
- b. Contractor shall timely comply with all notices and requests for additional compensation and extensions of time, including but not limited to all requirements of Article 48, as a prerequisite to filing any claim governed by this Article. The failure to timely provide any notice or request required by the Contract Documents shall constitute a waiver of the right to these procedures.
- c. **All Claims:** All claims shall be submitted in writing and accompanied by substantiating documentation. Claims must be filed on or before the date of final payment unless other notice requirements are provided in the contract. "Claim" means a separate demand by the Contractor for (1) a time extension, including without limitation relief from damages or penalties for delay assessed by the District, (2) payment of money or damages arising from work done by or on behalf of the Contractor and payment of which is not otherwise expressly provided for or the Contractor is not otherwise entitled, or (3) payment of an amount which is disputed by District.
- d. **All Claims.** The Contractor will submit the claim justification in the following format:
 - a. Summary of claim merit and price, and Contract clause pursuant to which the claim is made.
 - b. List of documents relating to claim
 - i. Specifications
 - ii. Drawings
 - iii. Clarifications (Requests for Information)
 - iv. Schedules

- v. Other
 - c. Chronology of events and correspondence
 - d. Analysis of claim merit
 - e. Analysis of claim cost
 - f. Analysis of time impact analysis in CPM format
 - g. Cover letter and certification of validity of the claim
- e. **District Response to Claim.** Upon receipt of a Claim pursuant to this Article, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days of receipt of the claim, or as extended by mutual agreement, shall provide a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Any payment due on an undisputed portion of the Claim will be processed and made within 60 days after the District issues its written response.

If the District needs approval from the Board of Directors to provide Contractor a written statement as set forth above, and Board of Directors does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a Claim, the District shall have up to three (3) days following the next publicly noticed meeting of Board of Directors after the 45-day period, or extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim.

The District may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the District may have. If additional information is needed thereafter, it shall be provided upon mutual agreement of the District and the claimant. The District's written response shall be submitted 30 days (15 days if the Claim is less than \$50,000) after receiving the additional documentation, or within the same period of time taken by the claimant to produce the additional information, whichever is greater.
- f. **Meet and Confer Conference.** If the Contractor disputes the District's response, or if the District fails to respond within the statutory time period(s), the Contractor may so notify the District within 15 days of the receipt of the response or the failure to respond, and demand an conference to meet and confer for settlement of those portions of the Claim that remain in dispute. Upon such demand, the District shall schedule a meet and confer conference within 30 Days.
- g. **Mediation.** Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion thereof remains in dispute, the District shall provide the Contractor with a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any portion of the claim that remains in dispute shall be submitted to nonbinding mediation. The selection of the mediator shall be in accordance with Public Contract Code section 9204 and the District and the Contractor shall equally share the associated mediator fees. Each party will be responsible for its own attorneys' fees and other costs incurred due to the resolution of any Claim.
- h. **Condition Precedent.** Submission of a claim, properly certified, with all required supporting documentation, and written rejection or denial of all or part of the claim by District, is a condition precedent to any action, proceeding, litigation, suit, general conditions claim, or demand for arbitration by Contractor.
- i. **Government Code Claim.** In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, construction claims

and/or changed conditions, the Contractor must comply with the claim procedures set forth in Government Code section 900 et seq. prior to filing any lawsuit against the District. Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, construction claims, and/or changed conditions have been followed by Contractor. If no such Government Code claim is submitted, or if the prerequisite contractual requirements are not otherwise satisfied as specified herein, Contractor shall be barred from bringing and maintaining a valid lawsuit against the District.

ARTICLE 53. DISTRICT'S RIGHT TO TERMINATE CONTRACT

- a. **Termination for Cause:** The District may, without prejudice to any other right or remedy, serve written notice upon Contractor of its intention to terminate this Contract if the Contractor: (i) refuses or fails to prosecute The Work or any part thereof with such diligence as will ensure its completion within the time required; (ii) fails to complete The Work within the required time; (iii) should file a bankruptcy petition or be adjudged a bankrupt; (iv) should make a general assignment for the benefit of its creditors; (v) should have a receiver appointed; (vi) should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials to complete the work; (vii) should fail to make prompt payment to subcontractors or for material or labor; (viii) persistently disregard laws, ordinances, other requirements or instructions of the District; or (ix) should violate any of the provisions of the Contract Documents.

The notice of intent to terminate shall contain the reasons for such intention to terminate. Unless within ten (10) Days after the service of such notice, such condition shall cease or satisfactory arrangements (acceptable to the District) for the required correction are made, this Contract shall be terminated. In such case, Contractor shall not be entitled to receive any further payment until the Project has been finished. The District may take over and complete The Work by any method it may deem appropriate. Contractor and its surety shall be liable to the District for any excess costs or other damages incurred by the District to complete the Project. If the District takes over The Work, the District may, without liability for so doing, take possession of and utilize in completing The Work such materials, appliances, plant, and other property belonging to the Contractor as may be on the Project site.

- b. **Termination For Convenience:** The District may terminate performance of The Work in whole or, in part, if the District determines that a termination is in the District's interest.

The Contractor shall terminate all or any part of The Work upon delivery to the Contractor of a Notice of Termination specifying that the termination is for the convenience of the District, the extent of termination, and the effective date of such termination.

After receipt of Notice of Termination, and except as directed by the District, the Contractor shall, regardless of any delay in determining or adjusting any amounts due under this Termination for Convenience clause, immediately proceed with the following obligations:

- 1) Stop Work as specified in the Notice.
- 2) Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality called for under the Contract Documents.
- 3) Leave the property upon which the Contractor was working and upon which the facility (or facilities) forming the basis of the Contract Documents is situated in a safe and sanitary manner such that it does not pose any threat to the public health or safety.

- 4) Terminate all subcontracts to the extent that they relate to the portions of The Work terminated.
 - 5) Place no further subcontracts or orders, except as necessary to complete the remaining portion of The Work.
 - 6) Submit to the District, within ten (10) Days from the effective date of the Notice of Termination, all of the documentation called for by the Contract Documents to substantiate all costs incurred by the Contractor for labor, materials and equipment through the Effective Date of the Notice of Termination. Any documentation substantiating costs incurred by the Contractor solely as a result of the District's exercise of its right to terminate this Contract pursuant to this clause, which costs the Contractor is authorized under the Contract Documents to incur, shall: (i) be submitted to and received by the District no later than thirty (30) Days after the Effective Date of the Notice of Termination; (ii) describe the costs incurred with particularity; and (iii) be conspicuously identified as "Termination Costs Occasioned by the District's Termination for Convenience."
 - 7) These provisions are in addition to and not in limitation of any other rights or remedies available to the District.
- c. Notwithstanding any other provision of this Article, when immediate action is necessary to protect life and safety or to reduce significant exposure or liability, the District may immediately order Contractor to cease Work on the Project until such safety or liability issues are addressed to the satisfaction of the District or the Contract is terminated.

ARTICLE 54. WARRANTY AND GUARANTEE

- a. Contractor warrants that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract Documents; and that all Work conforms to the Contract Document requirements and is free of any defect whether performed by the Contractor or any subcontractor or supplier.
- b. Unless otherwise stated, all warranty periods shall begin upon the filing of the Notice of Completion. Unless otherwise stated, the warranty period shall be for one year.
- c. The Contractor shall remedy at its expense any damage to District-owned or controlled real or personal property.
- d. Contractor shall furnish the District with all warranty and guarantee documents prior to final Acceptance of the Project by the District.
- e. The District shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. The Contractor shall within ten (10) Days after being notified commence and perform with due diligence all necessary Work. If the Contractor fails to promptly remedy any defect, or damage; the county shall have the right to replace, repair, or otherwise remedy the defect, or damage at the Contractor's expense.
- f. In the event of any emergency constituting an immediate hazard to health, safety, property, or licensees, when caused by Work of the Contractor not in accordance with the Contract requirements, the District may undertake at Contractor's expense, and without prior notice, all Work necessary to correct such condition.
- g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for Work performed and Materials furnished under this Contract, the Contractor shall:

- 1) Obtain for District all warranties that would be given in normal commercial practice;
- 2) Require all warranties to be executed, in writing, for the benefit of the District; and
- 3) Enforce all warranties for the benefit of the District, unless otherwise directed in writing by the District.

This Article shall not limit the District's rights under this Contract or with respect to latent defects, gross mistakes, or fraud. The District specifically reserves all rights related to defective work, including but not limited to the defect claims pursuant to California Code of Civil Procedure Section 337.15.

ARTICLE 55. DOCUMENT RETENTION & EXAMINATION

- a. In accordance with Government Code Section 8546.7, records of both the District and the Contractor shall be subject to examination and audit by the State Auditor General for a period of three (3) years after final payment.
- b. Contractor shall make available to the District any of the Contractor's other documents related to the Project immediately upon request of the District.
- c. In addition to the State Auditor rights above, the District shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including computations and projections) related to negotiating, pricing, or performing the modification in order to evaluate the accuracy and completeness of the cost or pricing data at no additional cost to the District, for a period of four (4) years after final payment.

ARTICLE 56. SOILS INVESTIGATIONS

When a soils investigation report for the Project site is available, such report shall not be a part of the Contract Documents. Any information obtained from such report as to subsurface soil condition, or to elevations of existing grades or elevations of underlying rock, is approximate only and is not guaranteed. Contractor acknowledges that any soils investigation report (including any borings) was prepared for purposes of design only and Contractor is required to examine the site before submitting its bid and must make whatever tests it deems appropriate to determine the underground condition of the soil.

ARTICLE 57. ASBESTOS FREE MATERIALS AND CERTIFICATION

Contractor shall, for all contracts submit an "Asbestos-Free Materials Certification." Contractor, further, is aware of the following:

- a. Should asbestos containing materials be installed by the Contractor in violation of this certification, or if removal of asbestos containing materials is part of the Project, decontaminations and removals will be performed in accordance with the requirements of all applicable laws and will meet the following criteria:
 1. Decontamination and removal of work found to contain asbestos or work installed with asbestos containing equipment shall be done only under the supervision of a qualified asbestos consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency (EPA). All work shall be done in accordance with work plan and specifications provided by the District's Asbestos Consultant.
 2. The asbestos removal contractor shall be an EPA accredited contractor qualified in the removal of asbestos.
 3. The asbestos consultant shall be chosen and approved by the District .

4. The work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.
- b. If removal of asbestos containing materials is part of the Project, the cost of all asbestos removal, including, but not necessarily limited to the cost of the asbestos removal contractor, the cost of the asbestos consultant, analytical and laboratory fees, time delays and additional costs that may be incurred by the District shall be borne entirely by the Contractor.
- c. **Hold Harmless:** Interface of work for the Project with work containing asbestos shall be executed by the Contractor at his/her risk and at his/her discretion with full knowledge of the currently accepted standards, hazards, risks and liabilities associated with asbestos work and asbestos containing products. By execution of the Contract, the Contractor acknowledges the above and agrees to the fullest extent permitted by law to hold harmless the District, its Governing Board, employees, agents, representatives, including its architect and assigns, for all asbestos liability which may be associated with this work. The Contractor further agrees to instruct his/her employees with respect to the above-mentioned standards, hazards, risk and liabilities.

ARTICLE 58. SEPARATE CONTRACTS

- a. The District reserves the right to let other contracts in connection with this Work or on the Project site. Contractor shall permit other contractors reasonable access and storage of their materials and execution of their work and shall properly connect and coordinate its Work with theirs.
- b. To ensure proper execution of its subsequent Work, Contractor shall immediately inspect work already in place and shall at once report to the District Representative any problems with the work in place or discrepancies with the Contract Documents.
- c. Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by the District in prosecution of the Project to the end that Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy at site of the Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project. If simultaneous execution of any contract for the Project is likely to cause interference with performance of some other contract or contracts, the District Representative shall decide which Contractor shall cease Work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously. The District shall not be responsible for any damages suffered or for extra costs incurred by Contractor resulting directly or indirectly from award, performance, or attempted performance of any other contract or contracts on the Project site.

ARTICLE 59. NOTICE AND SERVICE THEREOF

All notices shall be in writing and either served by personal delivery or mailed to the other party as designated in the Bid Forms. Written notice to the Contractor shall be addressed to Contractor's principal place of business unless Contractor designates another address in writing for service of notice. Notice to District shall be addressed to the District as designated in the Notice Inviting Bids unless District designates another address in writing for service of notice. Notice shall be effective upon receipt or five (5) Days after being sent by first class mail, whichever is earlier. Notice given by facsimile shall not be effective unless acknowledged in writing by the receiving party.

ARTICLE 60. NOTICE OF THIRD PARTY CLAIMS

Pursuant to Public Contract Code Section 9201, the District shall provide Contractor with timely notification of the receipt of any third-party claim relating to the Contract.

ARTICLE 61. STATE LICENSE BOARD NOTICE.

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within ten (10) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.

ARTICLE 62. INTEGRATION

- a. Oral Modifications Ineffective. No oral order, objection, direction, claim or notice by any party or person shall affect or modify any of the terms or obligations contained in the Contract Documents.
- b. Contract Documents Represent Entire Contract. The Contract Documents represent the entire agreement of the District and Contractor.

ARTICLE 63. ASSIGNMENT

Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this Contract or any part thereof including any claims, without prior written consent of the District. Any assignment without the written consent of the District shall be void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or Material supplied for performance of Work called for under the Contract Documents in favor of all persons, firms, or corporations rendering such services or supplying such Materials to the extent that claims are filed pursuant to the Civil Code, the Code of Civil Procedure or the Government Code.

ARTICLE 64. CHANGE IN NAME & NATURE OF CONTRACTOR'S LEGAL ENTITY

Should a change be contemplated in the name or nature of the Contractor's legal entity, the Contractor shall first notify the District in order that proper steps may be taken to have the change reflected on the Contract.

ARTICLE 65. ASSIGNMENT OF ANTITRUST ACTIONS

Pursuant to Section 7103.5 of the Public Contract Code, in entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractor offers and agrees to assign to the District all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (chapter 2 (commencing with Section 16700) of part 2 of division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to this Contract or any subcontract. This assignment shall be made and become effective at the time the District makes final payment to the Contractor, without further acknowledgment by the parties.

ARTICLE 66. PROHIBITED INTERESTS

No District official or representative who is authorized in such capacity and on behalf of the District to negotiate, supervise, make, accept, or approve, or to take part in negotiating, supervising, making, accepting or approving any engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the project, shall be or become directly or indirectly interested financially in the Contract.

ARTICLE 67. LAWS AND REGULATIONS

- a. Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on conduct of work as indicated and specified. If Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the District Representative in writing and any necessary changes shall be adjusted as provided for in this Contract for changes in work. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the District Representative, he shall bear all costs arising therefrom.
- b. Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 U.S.C. § 12101 et seq.). The Work will be performed in compliance with ADA regulations.

ARTICLE 68. PATENT FEES OR ROYALTIES.

The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work. Contractor shall assume all liability and responsibility arising from the use of any patented, or allegedly patented, materials, equipment, devices or processes used in or incorporated with The Work, and shall defend, indemnify and hold harmless the District, its officials, officers, agents, employees and representatives from and against any and all liabilities, demands, claims, damages, losses, costs and expenses, of whatsoever kind or nature, arising from such use.

ARTICLE 69. OWNERSHIP OF DRAWING(S)

All Contract Documents furnished by the District are District property. They are not to be used by Contractor or any subcontractor on other work nor shall Contractor claim any right to such documents. With exception of one complete set of Contract Documents, all documents shall be returned to the District on request at completion of The Work.

ARTICLE 70. NOTICE OF TAXABLE POSSESSORY INTEREST

In accordance with Revenue and Taxation Code Section 107.6, the Contract Documents may create a possessory interest subject to personal property taxation for which Contractor will be responsible.

ARTICLE 71. COMPLIANCE WITH DTSC GUIDELINES—IMPORTED SOILS

If the Project requires the use of imported soils, the Contractor shall be responsible to use and shall certify that the imported material it uses is free of any hazardous and/or toxic substance or material of any nature or type as defined in accordance with California Law and the California Health and Safety Code. The District reserves the right to reject any imported material that has come from agricultural or commercial land uses. Contractor must notify the District of the source of material and comply with the San Diego Regional Water Quality Control Board Resolution 95-63 and when applicable, with the guidelines of the Department of Toxic Substances Control (DTSC).

ARTICLE 72. DISTRICT'S INSPECTOR

- a. One or more inspectors employed by District in accordance with requirements of title 19, 21 and/or 24 of the California Code of Regulations may be assigned to the work. His duties are specifically defined in the California Code of Regulations.
- b. Inspector SHALL have access to all plant operations involving work under this contract and shall be provided reasonable advance notice of the time and place of operations which the inspector desires to observe. Inspector shall be provided with all necessary samples of materials and work for testing purposes. All work shall be under the observation of said inspector. He shall have

free access to any or all parts of work at any time. Contractor shall furnish inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting progress and manner of work and character of materials. Inspection of work shall not relieve contractor from any obligation to fulfill this contract. Inspector, after consultation with the Owner and architect, together, shall have authority to stop work whenever the provisions of the contract documents are not being complied with and contractor shall instruct his employees accordingly.

ARTICLE 73. INSPECTOR'S FIELD OFFICE

- a. If required, the Contractor shall be responsible for providing the inspector's field office. The office shall be of substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. Door shall have a key-type lock or padlock hasp. The inspector's field office shall have heating and air-conditioning and shall be equipped with a telephone, a telephone answering machine, and a fax machine at contractor's expense.
- b. A table satisfactory for the study of plans and two chairs shall be provided by contractor. Contractor shall provide and pay for adequate electric lights, local telephone service, and adequate heat and air conditioning for the field office until authorized removal.
- c. The provisions of this section are intended to be complementary to any requirements provided elsewhere in these Contract Documents, however in the event of conflicts between this section and other provisions of these Contract Documents, this section shall prevail.

SPECIAL CONDITIONS
REQUEST FOR BID NO. 1551
RELOCATABLE CLASSROOM MOVES
BOSTONIA LANGUAGE ACADEMY

- A. Time of Performance.** The work shall be commenced on the date stated in the District's notice to the Contractor to proceed, and shall be completed within dates stated on Contract (See Article 2 of Contract), **and in accordance with the scheduled dates as specified below.** District and Contractor each hereby stipulate that the stated performance period is accepted as reasonable and that no other performance period shall be acceptable unless accepted in writing (See Article 2 of Agreement and Article 6 of General Conditions.)

Work under this contract shall be scheduled and coordinated in compliance with the following:

1. Award of the contract is tentatively scheduled for March 9, 2021. The anticipated commencement of work will be: July 1, 2021.
2. Contractor shall complete all work and obtain all jurisdictional authorities' approval necessary to permit occupancy of all buildings for fixturing and outfitting no later than: July 30, 2021.
3. Contractor shall complete all work and obtain all jurisdictional authorities' approval of work under this contract necessary to permit occupancy of all buildings for district operations no later than: July 30, 2021.
4. If the site will not be available after the Notice to Proceed date, Contractor shall utilize this time period for administrative tasks and initial mobilization and shall coordinate such activities with District.

B. Important Dates

This tentative schedule has been developed to provide CVUSD sufficient time to make prudent decisions and to ensure timely implementation and cutover of the required systems, applications, goods and services. The District reserves the right to change the schedule.

Event	Date
Notice Inviting Bids	2/9/2021 & 2/16/2021
Job Walk Prospective Bidders may contact James Beard, Director of Maintenance & Operations, (619) 588-3023, to make arrangements to visit project sites	None
Questions due from Bidders* (by email to cropp@cajonvalley.net , Reference Bid 1551 in subject.)	2/17/21, 1:00 p.m.
Bid Opening	2/24/21, 1:00 p.m.
Anticipated Award Date	3/9/21
Commencement of Work:	7/1/21

Event	Date
Completion of Work:	7/30/21

*All questions must be submitted in writing to the email address: cropp@cajonvalley.net, by the question submittal due date and time listed above. Questions will be answered by addendum.

- C. Liquidated Damages.** If work under this contract is not ready for the intended use within the specified time period, the agreed liquidated damages established in Article 6 of the General Conditions, per calendar day for each calendar date completion is delayed will be Five Hundred dollars (\$500) per day per school site.
- D. Documents Furnished.** The number of copies of electronic drawings and specifications (as applicable) to be furnished to Awarded Contractor free of charge, per Article 3 of the General Conditions, are one (1).
- E. Bonds.** Contractor shall provide (i) a bid bond in the amount of ten (10%) of the contract price; (ii) a payment bond in the total amount of one hundred percent (100%) of the contract price; and (iii) a performance bond in the amount of one hundred percent (100%) of the contract price.

Cajon Valley Union School District will require a payment bond issued by an admitted Surety approved to conduct business in the State of California from the successful bidder regardless of the contract amount.

Rating for the surety must be A++, A+, A, or no less than A-. Rating information can be obtained from Best's State Rate Filings: <http://www.ambest.com/bsrf>

- F. Insurance.** As specified in the General Conditions, Articles 36 - 41, Contractor shall procure and maintain and shall require all subcontractors, if any, whether primary or secondary, to procure and maintain :

Workers' Compensation as prescribed by State Law

Automobile Liability Insurance

..... \$1,000,000 per occurrence/\$3,000,000 general aggregate

Comprehensive General Liability Insurance.

with a combined single limit per occurrence

of not less than . . . \$1,000,000 per occurrence/\$3,000,000 general aggregate

OR Commercial General Liability and Property Damage Insurance

(including automobile insurance) which provides limits of not less than:

(a) Per occurrence (combined single limits) \$1,000,000

(b) Project Specific Aggregate (for this project only). \$1,000,000

(c) Products/Completed Operation	\$1,000,000
(d) Personal & Advertising Injury limit	\$1,000,000

Insurance Covering Special Hazards: Following special hazards shall be covered by riders or riders to above-mentioned commercial liability insurance or property damage insurance policy or policies of insurance, or by special policies of insurance, in amounts as follows:

Automotive and truck where operated in amounts	\$1,000,000
Material hoist where used in amounts	\$1,000,000
Explosion, collapse & Underground (XCU) coverage	\$1,000,000
Excess Liability Insurance coverage in the amount of	\$1,000,000

AND

- (a) ~~Builder's Risk (or Course of Construction Coverage) Applicable/Fire Insurance (See Article 40) Project Replacement Value at replacement value, \$100% (One Hundred Percent)-Waived for this project~~
- (b) ~~Sexual Abuse/Molestation.....\$1,000,000 per occurrence/\$2,000,000 general aggregate-(Waived for this project)~~

Additional Insured Endorsements (Refer to Article 41): Any liability policy provided by Contractor hereunder shall contain an endorsement which applies its coverage to District, members of District's board of trustees, and the officers, agents, employees and volunteers of District, the State Allocation Board, if applicable, the architect, and the architect's consultants, individually and collectively, as additional insureds.

MINIMUM INSURANCE REQUIREMENTS: Contractor shall obtain and maintain the insurance coverages and limits as specified for the duration of the contract. The insurance coverages and limits of liability shown are the minimum insurance requirements in this Agreement. Should Contractor maintain insurance policies with coverage and limits of liability that exceed these minimum coverage and limit requirements that are broader than as outlined, those broader coverages and higher limits shall be deemed to apply for the benefit of the District and those coverages and limits shall become the required minimum limits of insurance and coverage in all sections of this Agreement.

- G. Executed Copies:** The number of executed originals of the Contract, the Performance Bond, and the Payment Bond for Public Works required is two (2).
- H. License Classification:** Each bidder shall be a licensed Contractor pursuant to the Business and Professions Code and shall be licensed in the following classification(s): **B-General.**
- I. Fingerprinting:** District determination of Fingerprinting Requirement Application is as follows: The District has considered the totality of the circumstances concerning the contract and has determined that ***fingerprinting will be waived.*** However, all

employees should take care to not be in contact whatsoever with any students in the vicinity as they are performing the project. Any employees of the bidder having such contact will be expected to be removed for the project immediately.

- J. MICHELLE MONTOYA SCHOOL SAFETY ACT (CHAPTER 588, 1997 STATUTES) (COMMUNICATION WITH PUPILS):** In performing this Agreement, the Successful Bidder shall be required to prohibit its employees and its subcontractors from having contact with pupils.

Any employees who perform services under this agreement will not be permitted to come in contact with pupils or communicate with pupils. In the event Bidder fails to prevent its employees from having contact with pupils or communicating with pupils and injury results from failure to prohibit pupil contact or communication, Bidder shall defend, indemnify, protect, and hold Cajon Valley Union School District and its agents, officers and employees harmless from and against any and all claims, demands, liability, judgments, awards, losses, injury, damages, expenses, charges or costs of any kind or character whether to the District or to any person or property which arise from or are connected with or are caused or claimed to be caused by Bidder's failure to prohibit its employees from having pupil contact or communication.

Any employee and/or subcontractors hired by Bidder shall be subject to and shall comply with this provision. Bidder and employee/subcontractor shall be jointly and severally liable for any injury that results from employee/subcontractor's failure to comply with this provision.

- K. Award of Bid:** The Owner reserves the right to reject any or all bids, or to waive any irregularities or ities in any bids or in the bidding. The award of the contract, if made by the Owner, will be to the lowest responsive, responsible bidder(s) therefore.
- L. Work Schedule:** The proposed work schedule will be reviewed by James Beard, Director, Facilities, Maintenance & Operations, beardj@cajonvalley.net, (619) 588-3023. The Contractor shall submit a proposed work schedule and shall obtain the District's approval of the work schedule prior to starting work.
- M. Safety:** The contractor shall be responsible for the safety of his workers and his subcontractors, the public, and district staff, within his area of work. The contractor shall provide substantial barricades around his area of work. When operating large, noisy pieces of equipment such as trucks, augers, back hoes, etc. during business hours, the contractor shall provide a workman specifically to stand or walk beside the equipment to assure public and/or staff stay clear.
At the end of each workday the area shall be left reasonably free of debris and secured. Holes and trenches shall be scheduled so that they are covered or filled as soon as possible.
- N. Noise:** Operations which create intense, sustained noise shall be scheduled for off hours and weekends.
- O. Tobacco Free Schools**
Per Board Policy BP 3513.3(a), The Governing Board recognizes the health hazards associated with tobacco products, including the breathing of second-hand smoke, and desires to provide a healthy environment for students and staff. The Board prohibits the

use of tobacco products at all times in District-owned or leased buildings, on District property, and in District vehicles. This prohibition applies to all employees, students and visitors at any activity or athletic event.

Per Board Administrative Regulation 3513.3(a), any person who violates the District's policy on tobacco-free schools shall be informed of the District's policy and asked to refrain from smoking. If the person fails to comply with this request, the Superintendent or designee may:

- 1) Direct the person to leave school property.
- 2) Request local law enforcement assistance in removing the person from school premises.
- 3) If the person repeatedly violates the tobacco-free schools policy, prohibit him/her from entering District property for a specified period of time.

P. District Calendar:

6/17/21	Last Day of School for Students
6/18/21	Last Day of School for Teachers
6/24/21	Last Day of School for Office
7/30/21	Principals Return to School
8/2/21	School Staff Return to School
8/10/21	School Offices Open to the Public
8/17/21	First Day of School for Students

END OF SPECIAL CONDITIONS



CAJON VALLEY UNION SCHOOL DISTRICT

Bostonia Language Academy Modular Classroom Buildings Relocation

PROJECT MANUAL

APPL. #: 04-119479

FILE #: 37-9

DSA Resubmittal

November 6, 2020

PREPARED FOR:

**CAJON VALLEY UNION SCHOOL DISTRICT
750 EAST MAIN STREET
EL CAJON, CA 92020**

PREPARED BY:



**HARLEY ELLIS DEVEREAUX
225 Broadway, Suite 1300
SAN DIEGO, CA 92101**

Project No. 2020-06795-000

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CONSULTANTS PAGE

PROJECT

Modular Classroom Buildings Relocation
Boston Language Academy
1390 East Broadway
El Cajon, CA 92021

OWNER

Cajon Valley Union School District
Contact: Sharon Dobbins
750 East Main Street
El Cajon, CA 92020
Phone: (619) 588-3016
Email: dobbinss@cajonvalley.net

ARCHITECT

HED
225 Broadway, Suite 1300
San Diego, CA 92101
Phone: (619) 398-3800

16885 West Bernardo Drive, Suite 118
San Diego, CA 92127
Phone: (858) 746-9701

ELECTRICAL ENGINEER

IMEG
901 Via Piemonte, Suite 400
Ontario, CA 91764
Phone: (909) 477-6915

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ARCHITECT

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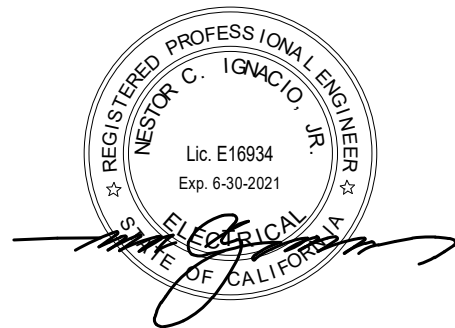
225 Broadway, Suite 1300
San Diego, CA 92101



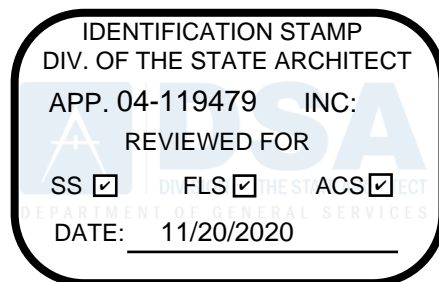
ELECTRICAL ENGINEER

IMEG

901 Via Piemonte, Suite 400
Ontario, CA 91764



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To be prepared by CVUSD

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SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Project site and building demolition work to prepare for addition of new improvements, as indicated on the Drawings and specified herein. General and Special Conditions and Division 1 specification sections apply to this section.
- B. Related Sections:
 - 1. Section 31 20 00, Earth Moving

1.02 DEFINITIONS

- A. "Remove": Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. "Removed and Salvaged": Items to remain the Owner's property shall be removed, cleaned, and packed or crated to protect against damage.
 - 1. Identify contents of containers and deliver to Owner's designated storage area.
- C. "Existing to Remain" Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.
- D. "Remove and Reinstall": Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated.
- E. Salvaged Materials (not wanted by Owner): Items which the Owner does not want and is of salvable value to Contractor may be removed from structure as work progresses. Owner and CBC 2019 require a minimum of 50% (by weight) of all non-hazardous construction materials be recycled, composted and/or salvaged. Salvage shall conform to the following:
 - 1. Contractor shall submit salvage plan showing how all materials are to be sorted, salvaged and recycled. Plan must include all final destinations for each type of material.
 - 2. Salvaged items must be transported from site as they are removed, unless materials are to be reused on site.
 - 3. Storage or sale of removed items on site will not be permitted, unless materials are to be reused on site.
 - 4. Contractor shall provide certification for all salvaged materials. Certifications may take the form of receipts from recycling facilities, manufacturers, or any other legitimate form of certification. Certification types shall be outlined in salvage plan and approved by Owner.

1.03 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged or otherwise indicated

to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition by the Contractor(s) in a legal disposal area appropriate to the materials being disposed.

1.04 SUBMITTALS

- A. Submit each item in this Article according to the Conditions of the Contract and Specifications Section 01 33 00, unless otherwise indicated.
- B. Proposed Dust Control Measures.
- C. Proposed Noise Control Measures.
- D. Schedule of demolition activities indicating the following:
 - 1. Detailed sequence of demolition, salvage, and removal work, with starting and ending dates for each activity.
 - 2. Dates for shutoff, capping, and continuation of utility services.
- E. Salvage Plan - Inventory of items to be removed and salvaged. Salvage plan shall show how all materials are to be sorted, salvaged and recycled. Plan must include all final destinations for each type of material.
- F. Inventory of items to be removed and salvaged, and deliver to Owner's designated storage area.
- G. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and improvements that might be misconstrued as damage caused by demolition operations.
- H. Record drawings at project closeout according to specifications section 01 77 00 - Closeout Procedures shall identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.05 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Predemolition Conference: Conduct conference at Project site with Owner, Architect and Construction Manager.

1.06 PROJECT CONDITIONS

- A. Building, where partial wall will be demolished, will be vacated and its use discontinued before start of the Work.
- B. Conditions, existing at time of inspection for bidding purpose, will be maintained by Owner as far as practical.
- C. Hazardous Materials: If applicable, a Hazardous Materials Study was performed on site and a specification for removal of said materials is incorporated into the project documents.

1.07 SCHEDULING

- A. Arrange demolition and salvage schedule so as not to interfere with Owner's on-site operations.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- C. Inventory and record the conditions of items to be removed and reinstalled and items to be removed and salvaged.
- D. Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
- E. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner, and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
- C. Provide not less than 72 hours notice to Owner if shutdown of service is required during changeover.
- D. Utility Requirements: Refer to Division 21 through Division 26 sections for shutting-off, disconnecting, removing, and sealing or capping utility services. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.03 PREPARATION

- A. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- C. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to remain.
1. Strengthen or add new supports when required during progress of demolition.

3.04 EXPLOSIVES

- A. The use of explosives will not be permitted.

3.05 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
1. Do not create hazardous or objectionable conditions, such as flooding, and pollution, when using water.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- C. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.06 DEMOLITION

- A. Demolish partial building wall, concrete and/or asphalt paving, interior finishes, fixtures and accessories, as required to prepare for new construction, and remove from the site.
- B. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- C. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- D. Fill below-grade areas and voids resulting from demolition of building elements and pavements and soil materials according to requirements specified in Section 31 20 00 – Earth Moving and/or geotechnical report.
- E. Promptly repair damages to adjacent facilities caused by demolition operations.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning demolished materials is not allowed.

- C. Transport demolished materials off Owner's property and legally dispose of these materials.

END OF SECTION

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SECTION 26 05 05

ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work shall be as specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. THE DRAWINGS ARE INTENDED TO INDICATE THE SCOPE OF WORK REQUIRED AND DO NOT INDICATE EVERY BOX, CONDUIT, OR WIRE THAT MUST BE REMOVED. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS.
- B. Where walls, ceilings, structures, etc., are indicated as being removed on general or electrical drawings, the Contractor shall be responsible for the removal of all electrical equipment, devices, fixtures, raceways, wiring, systems, etc., from the removed area.
- C. Where ceilings, walls, structures, etc., are temporarily removed and replaced by others, this Contractor shall be responsible for the removal, storage, and replacement of equipment, devices, fixtures, raceways, wiring, systems, etc.
- D. Where mechanical or technology equipment is indicated as being removed on electrical or technology drawings, the Contractor shall be responsible for disconnecting the equipment and removing all starters, controllers, electrical equipment, raceways, wiring, etc. associated with the device.
- E. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities and equipment that will remain in operation following demolition. Extension of conduit and wire to equipment shall be compatible with the surrounding area. Extended conduit and conductors to match existing size and material.
- F. Coordinate scope of work with all other Contractors and the Owner at the project site. Schedule removal of equipment and electrical service to avoid conflicts.
- G. Bid submittal shall mean the Contractor has visited the project site and has verified existing conditions and scope of work.

3.2 PREPARATION

- A. The Contractor shall obtain approval from the Owner before turning off power to circuits, feeders, panels, etc. Coordinate all outages with Owner.
- B. Coordinate utility service outages with Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. Assume all equipment and systems must remain operational unless specifically noted otherwise on drawings.
- D. Disconnect electrical systems in walls, floors, structures, and ceilings scheduled for removal.
- E. Existing Electrical Service: Maintain existing system in service until new system extension is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Obtain permission from Owner at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Provide a watchman to make required premise observations during all outages, requirements as dictated by codes and Owner's insurance carrier.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Division 1 of Specifications and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring and raceway to source of supply. Existing conduit in good condition may be reused in place by including an equipment ground conductor in reused conduit. Reused conduit and boxes shall have supports revised to meet current codes. Relocating conduit shall not be allowed.
- D. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces. Remove all associated clamps, hangers, supports, etc. associated with raceway removal.
- E. Disconnect and remove outlets and devices that are to be demolished. Remove outlet or devices' associated back box, supports, and conduit and conductors back to source. Patch opening created from removal of device to match surrounding finishes.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories. Ballasts in light fixtures installed prior to 1980 shall be incinerated in EPA approved incinerator or disposed of in EPA certified containers and deposited in an EPA landfill certified for PCB disposal or recycled by permitted ballast recycler. Punctured or leaking ballasts must be disposed of according to Federal Regulations under the Toxic Substance Control Act. Provide Owner and Architect/Engineer with a Certificate of Destruction to verify proper disposal.
 - I. Repair adjacent construction and finishes damaged during demolition and extension work. Patch openings to match existing surrounding finishes.
 - J. Maintain access to existing electrical installations that remain active. Modify installation or provide junction boxes and access panel as appropriate.
 - K. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified. Extended conduit and conductors to match existing size and material.
 - L. HID and fluorescent lamps, determined by the Toxicity Characteristic Leachate procedure (TCLP), to be hazardous waste shall be disposed of in an EPA-permitted hazardous waste disposal facility or by a permitted lamp recycler.
 - M. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
 - N. Floor slabs may contain conduit systems. This Contractor is responsible for taking any measures required to ensure no conduits or other services are damaged. This includes x-ray or similar non-destructive means. Where conduit is in concrete slab, cut conduit flush with floor, pull out conductors, and plug conduit ends.
 - O. This Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.
- 3.4 CLEANING AND REPAIR
- A. Clean and repair existing materials and equipment that remain or are to be reused.
 - B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- 3.5 INSTALLATION
- A. Install relocated materials and equipment under the provisions of Division 1 of Specifications.

END OF SECTION

SECTION 26 05 13

WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire
- B. Remote control and signal cable

1.2 RELATED WORK

- A. Section 26 05 53 – Electrical Identification: Refer to electrical identification for color and identification labeling requirements.

1.3 REFERENCES

- A. NEMA WC 70 - Power Cables Rated 2,000V or Less for the Distribution of Electrical Energy
- B. California Electrical Code (CEC)
- C. UL 44 – Thermoset-Insulated Wires and Cables
- D. UL 83 – Thermoplastic-Insulated Wires and Cables
- E. UL 854 – Service-Entrance Cables
- F. UL 1581 – Standard for Electrical Wires, Cables, and Flexible Cords
- G. California Division of State Architect (DSA) Interpretation of Regulations

1.4 SUBMITTALS

- A. Submit shop drawings and product data under the provisions of Section 26 05 00.
- B. Submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600-volt insulation, THHN/THWN or XHHW-2.
- B. Feeders and Branch Circuits Larger Than 6 AWG in Underground Conduit: Copper, stranded conductor, 600-volt insulation, THWN or XHHW-2.
- C. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600-volt insulation, THHN/THWN. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid or stranded conductor, unless otherwise noted on the drawings. Aluminum, compact stranded conductor is not acceptable for feeder and branch circuits 6 AWG and smaller.
- D. Control Circuits: Copper, stranded conductor 600-volt insulation, THHN/THWN.
- E. Each 120 and 277-volt branch circuit shall have a dedicated neutral conductor. Neutral conductors shall be considered current-carrying conductors for wire derating.

PART 3 - EXECUTION

3.1 WIRE AND CABLE INSTALLATION SCHEDULE

- A. Above Accessible Ceilings:
 - 1. Building wire shall be installed in raceway.
- B. All Other Locations: Building wire in raceway.
- C. Above Grade: All conductors installed above grade shall be type "THHN".
- D. Underground or In Slab: All conductors shall be type "THWN".
- E. Low Voltage Cable (less than 100 volts): Low voltage cables in ducts, plenums, and other air handling spaces shall be plenum listed. Low voltage cables in non-accessible areas shall be installed in conduit. Low voltage cable may be installed without conduit in accessible areas using the following types of cable supports. Cable support types/systems shall comply with the warranty requirements of the low voltage cable manufacturer.
 - 1. J-hooks
 - 2. Bridle rings with saddle supports

3.2 CONTRACTOR CHANGES

- A. The basis of design is copper conductors installed in raceway based on ambient temperature of 30°C, CEC Table 310.16. Service entrance conductors are based on copper conductor installed in underground electrical ducts, CEC Table B.310.15(B)(2)(7).
- B. The Contractor shall be responsible for derating and sizing conductors and conduits to equal or exceed the ampacity of the basis of design circuits, if he/she chooses to use methods or materials other than the basis of design.
- C. Underground electrical duct ampacity rating shall be in accordance with CEC Table B.310.15(B)(2)(7) or calculated in accordance with Annex B Application Information for Ampacity Calculation. The calculations and a sketch of the proposed installation shall be submitted prior to any conduit being installed.
- D. Record drawing shall include the calculations and sketches.

3.3 GENERAL WIRING METHODS

- A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
- B. Use no wire smaller than 18 AWG for low voltage control wiring (<100 volts).
- C. Use 10 AWG conductor for 20 ampere, 120-volt branch circuit home runs longer than 75 feet, and for 20 ampere, 277-volt branch circuit home runs longer than 200 feet.
- D. Use no wire smaller than 8 AWG for outdoor lighting circuits.
- E. The ampacity of multiple conductors in one conduit shall be derated per CEC 310. In no case shall more than 4 conductors be installed in one conduit to such loads as motors larger than 1/4 HP, panelboards, motor control centers, etc.

- F. Where installing parallel feeders, place an equal number of conductors for each phase of a circuit in same raceway or cable.
- G. Splice only in junction or outlet boxes.
- H. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- I. Make conductor lengths for parallel circuits equal.
- J. All conductors shall be continuous in conduit from last outlet to their termination.
- K. Terminate all spare conductors on terminal blocks, and label the spare conductors.
- L. Cables or wires shall not be laid out on the ground before pulling.
- M. Cables or wires shall not be dragged over earth or paving.
- N. Care shall be taken so as not to subject the cable or wire to high mechanical stresses that would cause damage to the wire and cable.
- O. At least six (6)-inch loops or ends shall be left at each outlet for installation connection of luminaires or other devices.
- P. All wires in outlet boxes not connected to fixtures or other devices shall be rolled up, spliced if continuity of circuit is required, and insulated.

3.4 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricant for pulling 4 AWG and larger wires.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Pulling shall be continuous without unnecessary stops and starts with wire or cable only partially through raceway.
- D. Where reels of cable or wire are used, they shall be set up on jacks close to the point where the wire or cable enters the conduit or duct so that the cable or wire may be unreeled and run into the conduit or duct with a minimum of change in the direction of the bend.
- E. Conductors shall not be pulled through conduits until plastering or masonry work is completed and conduits are free from moisture. Care shall be taken so that long pulls of wire or pulls around several bends are not made where the wire may be permanently stretched and the insulation damaged.
- F. Only nylon rope shall be permitted to pull cables into conduit and ducts.
- G. Completely and thoroughly swab raceway system before installing conductors.
- H. Conductor Supports in Vertical Raceways:
 - 1. Support conductors in vertical raceways in accordance with CEC 300.19 and Table 300.19(A) Spacing of Conductors Supports.

2. Supports shall be of insulated wedge type (OZ Gedney Type S, or equal) and installed in a tapered insulated bushing fitting or a metal woven mesh with a support ring that fits inside conduit fitting installed in an accessible junction box (Hubbell Kellems support grip or equal).

3.5 CABLE INSTALLATION

- A. Provide protection for exposed cables where subject to damage.
- B. Use suitable cable fittings and connectors.
- C. Run all open cable parallel or perpendicular to walls, ceilings, and exposed structural members. Follow the routing as illustrated on the drawings as closely as possible. Cable routing on drawings scaled 1/4"=1'-0" or less shall be considered diagrammatical, unless noted otherwise. The correct routing, when shown diagrammatically, shall be chosen by the Contractor based on information in the contract documents; in accordance with the manufacturer's written instructions, applicable codes, the NECA's "Standard of Installation", recognized industry standards; and coordinated with other contractors.
- D. Open cable shall be supported by the appropriate size J-hooks or other means if called for on the drawings. Wire and cable from different systems shall not be installed in the same J-hook. J-hooks shall be sized with 20% spare capacity. J-hooks shall provide proper bend radius support for data cable and fiber cables.
- E. Open cable installed above suspended ceilings shall not rest on the suspended ceiling construction, nor utilize the ceiling support system for wire and cable support.
- F. J-hook supports shall be installed at a maximum of five-foot (5') intervals. All J-hooks shall be installed where completely accessible and not blocked by piping, ductwork, inaccessible ceilings, etc. J-hooks shall be independently rigidly attached to a structural element. J-hooks shall be installed to provide 2" horizontal separation and 6" vertical separation between systems.
- G. Open cable shall only be installed where specifically shown on the drawings, or permitted in these specifications.

3.6 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice and tap only in accessible junction boxes.
- B. Use solderless, tin-plated copper, compression terminals (lugs) applied with circumferential crimp for conductor terminations, 8 AWG and larger.
- C. Use solderless, tin-plated, compression terminals (lugs) applied with indenter crimp for copper conductor terminations, 10 AWG and smaller.
- D. Use solderless pressure connectors with insulating covers for copper wire splices and taps, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps.
- E. Use compression connectors applied with circumferential crimp for conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.
- F. Thoroughly clean wires before installing lugs and connectors.

- G. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- H. Phase Sequence: All apparatus shall be connected to operate in the phase sequence A-B-C representing the time sequence in which the phase conductors so identified reach positive maximum voltage.
- I. As a general rule, applicable to switches, circuit breakers, starters, panelboards, switchgear and the like, the connections to phase conductors are intended thus:
 - 1. Facing the front and operating side of the equipment, the phase identification shall be:
 - a. Left to Right - A-B-C
 - b. Top to Bottom - A-B-C
- J. Connection revisions as required to achieve correct rotation of motors shall be made at the load terminals of the starters or disconnect switches.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1.
- B. Building Wire and Power Cable Testing: Perform an insulation-resistance test on each conductor with respect to ground and adjacent conductors. Test shall be made by means of a low-resistance ohmmeter, such as a "Megger". The applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. The test duration shall be one minute. Insulation resistance must be greater than 100 mega-ohm for 600 volt and 25 mega-ohm for 300 volt rated cables per NETA Acceptance Testing Standard. Verify uniform resistance of parallel conductors.
- C. Inspect wire and cable for physical damage and proper connection.
- D. Torque test conductor connections and terminations to manufacturer's recommended values.
- E. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.
- F. Provide documentation of the manufacturer's recommended lug torque value for copper and aluminum conductors, the date the lugs were torqued, and installed torque readings. Documentation indicating that the torque wrench has been calibrated not more than 30 days prior to tightening of lugs shall be provided.
- G. Protection of wire and cable from foreign materials:
 - 1. It is the Contractor's responsibility to provide adequate physical protection to prevent foreign material application or contact with any wire or cable type. Foreign material is defined as any material that would negatively impact the validity of the manufacturer's performance warranty. This includes, but is not limited to, overspray of paint (accidental or otherwise), drywall compound, or any other surface chemical, liquid, or compound that could come in contact with the cable, cable jacket, or cable termination components.
- H. Overspray of paint on any wire or cable will not be accepted. It shall be the Contractor's responsibility to replace any component containing overspray, in its entirety, at no

additional cost to the project. Cleaning of the cables with harsh chemicals is not allowed.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Equipment grounding system
- B. Bonding system
- C. Grounding electrode system

1.2 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the International Electrical Testing Association and that is acceptable to authorities having jurisdiction.
- B. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with UL 467 Grounding and Bonding Equipment.
- E. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.
- F. Comply with CEC; for overhead-line construction and medium-voltage underground construction, comply with IEEE/ANSI C2 National Electrical Safety Code (NESC).

1.3 REFERENCES

- A. 2019 California Electrical Code (CEC)

1.4 SUBMITTALS

- A. Submit product data.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Chemical electrodes.
- C. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- D. Indicate layout of ground field, location of system grounding electrode connections, and routing of grounding electrode conductor and ground ring.

1.5 SUMMARY

- A. This section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 26 Section 26 05 13 "Wire and Cable".
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- G. Sizes and types below are typical. Adjust to suit Project conditions and requirements.
- H. Copper Bonding Conductors: As follows:
 - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
 - 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 - 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- I. Intersystem Bonding Termination:
 - 1. Copper bar, 1/4" x 2" x 24". Provide with wall mounting brackets, insulators and pre-tapped holes.
 - 2. Approved Manufacturers: Harger GBI Series, Erico B544 Series.

2.2 CONNECTOR PRODUCTS

- A. Comply with UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.
- C. Bolted Connectors: Bolted-pressure-type connectors.

- D. Substation connectors shall comply with IEEE 837 listed for use for specific types, sizes, and combinations of conductors and connected items.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Sectional type; copper-clad steel.

- 1. Size: 3/4" in diameter by 120 inches

PART 3 - EXECUTION

3.1 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- D. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- E. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- F. Structural Steel Connection: Exothermic-welded connections to structural steel. Coordinate with structure to provide physical protection.

- G. Underground Connections: Exothermic-welded connections Use for underground connections, except those at test wells.
- H. Connections at Test Wells: Use compression-type connectors on conductors and make two bolted- and clamped-type connections between conductors and ground rods.
- I. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- J. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.2 INSTALLATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Each grounding conductor that passes through a below grade wall must be provided with a waterstop.
- C. Grounding electrode conductor (GEC) shall be protected from physical damage by rigid polyvinyl chloride conduit (PVC) in exposed locations.
- D. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then use a bolted clamp. Bond straps directly to the basic structure, taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- E. In raceways, use insulated equipment grounding conductors.
- F. Underground Grounding Conductors: Use tinned copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.

3.3 EQUIPMENT GROUNDING SYSTEM

- A. Comply with CEC, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by CEC are indicated.
- B. Install equipment grounding conductors in all feeders and circuits. Terminate each end on a grounding lug or bus.
- C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by CEC:
 - 1. Lighting and receptacle circuits. Terminate each end on a grounding lug or bus.
 - 2. Single-phase and three-phase motor and appliance branch circuits.

3. Flexible raceway runs, including FMC and LPMC.
- D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- E. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

3.4 BONDING SYSTEM

- A. At building expansion joints, provide flexible bonding jumpers to connect to columns or beams on each side of the expansion joint.
- B. Isolated Equipment Enclosure: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment bonding conductor.
- C. Exterior Metallic Pull and Junction Box Covers, Metallic Hand Rails: Bond to grounding system using flexible grounding conductors.
- D. Water Heater, Heat-Tracing, Metal Well Casing, and Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and anti-frost heating cable. Bond conductor to heater units, piping, well casing, connected equipment, and components.
- E. Connect bonding conductors to metal water pipe using a suitable ground clamp. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter.
- F. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 6 AWG minimum insulated bonding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location. Leave 10 feet of slack conductor at terminal board.
- G. Telecom Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bar.
- H. Terminal Cabinets: Terminate bonding conductor on cabinet grounding terminal.
- I. Remote control, signaling, and fire alarm circuits shall be bonded in accordance with the most 2019 version of the California Electric Code (CEC).

3.5 GROUNDING ELECTRODE SYSTEM

- A. Supplementary Grounding Electrode: Use driven ground rod on exterior of building.
- B. Provide bonding at Utility Company's metering equipment and pad mounted transformer.
- C. Ground Rods: Install at least two rods spaced at least 20 feet from each other and located at least the same distance from other grounding electrodes.
 1. Drive ground rods until tops are 12 inches below finished floor or final grade, unless otherwise indicated.

2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond each aboveground portion of natural gas metallic piping system at equipment locations. The equipment grounding conductor may serve as the bonding means.
- G. Concrete-Encased Grounding Electrode (Ufer): Install concrete-encased grounding electrode encased in at least 2 inches (50mm) of concrete horizontally within the foundation that is in contact with the earth. If concrete foundation is less than 20 feet long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.6 CONCRETE OR WOOD BUILDING GROUNDING SYSTEM

- A. Provide a copper common grounding electrode conductor for the attachment of multiple separately derived systems in accordance with CEC 250.30(A)(4)(a) through 250.30(A)(4)(c). Individual grounding conductor taps from the separately derived systems to the common grounding electrode shall be sized in accordance with CEC 250.66. All tap connections shall be made in an accessible location in such a manner that common grounding electrode conductor remains without a splice or joint.

3.7 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
 1. Measure ground resistance from system neutral connection at service entrance to convenient ground reference points using suitable ground testing equipment. Resistance shall not exceed 5 ohms.
 2. Testing: Owner will engage a qualified testing agency to perform the following field quality-control testing:
 3. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
 4. Testing: Perform the following field quality-control testing:
 - a. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - b. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground

resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.

- c. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - 1) Equipment Rated 500 kVA and Less: 10 ohms.
 - 2) Equipment Rated 500 to 1000 kVA: 5 ohms.
 - 3) Equipment Rated More Than 1000 kVA: 3 ohms.
 - 4) Substations and Pad-Mounted Switching Equipment: 5 ohms.
 - 5) Manhole Grounds: 10 ohms.
- d. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect/Engineer promptly and include recommendations to reduce ground resistance.

3.8 GRADING AND PLANTING

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2. Maintain restored surfaces. Restore disturbed paving.

END OF SECTION

SECTION 26 05 27

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conduit and equipment supports
- B. Fastening hardware
- C. Concrete housekeeping pads

1.2 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

1.3 COORDINATION

- A. Coordinate size, shape and location of concrete pads with Section on Cast-in-Place Concrete or Concrete Topping.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Allied Support Systems
- B. Cooper B-Line
- C. Erico, Inc.
- D. Hilti
- E. Power Fasteners

2.2 MATERIAL

- A. Support Channel: Hot-dip galvanized stainless steel for wet/damp locations; painted steel for interior/dry locations. All field cut ends shall be touched up with matching finish to inhibit rusting.
- B. Hardware: Corrosion resistant.
- C. Anchorage and Structural Attachment Components:
 - 1. Strength: Defined in reports by ICBO Evaluation Service or another agency acceptable to Authorities Having Jurisdiction.
 - a. Structural Safety Factor: Strength in tension and shear of components used shall be at least two times the maximum seismic forces to which they will be subjected.
 - 2. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325.
 - 3. Welding Lugs: Comply with MSS-SP-69, Type 57.

4. Beam clamps for Steel Beams and Joists: Double sided. Single-sided type is not acceptable.
 5. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to the type and size of anchor bolts and studs used.
 6. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to the type and size of attachment devices used.
 7. Concrete Anchors: Fasten to concrete using cast-in or post-installed anchors designed per the requirements of Appendix D of ACI 318-05. Post-installed anchors shall be qualified for use in cracked concrete by ACI-355.2.
 8. Masonry Anchors: Fasten to concrete masonry units with expansion anchors or self-tapping masonry screws. For expansion anchors into hollow concrete block, use sleeve-type anchors designed for the specific application. Do not fasten in masonry joints. Do not use powder actuated fasteners, wooden plugs, or plastic inserts.
- D. Concrete Housekeeping Pads:
1. Concrete bases for all floor mounted equipment and wall mounted equipment which is surface mounted and extends to within 6" of the finished floor, unless shown otherwise on the drawings, shall be 3-1/2" thick concrete.
 2. Bases shall extend 3" on all sides of the equipment (6" larger than factory base).
 3. Where the base is less than 12" from a wall, the base shall be carried to the wall to prevent a "dirt-trap".
 4. Concrete materials and workmanship required for the Contractor's work shall be provided by him. Materials and workmanship shall conform to the applicable standards of the Portland Cement Association. Reinforce with 6" x 6", W1.4-W1.4 welded wire fabric. Concrete shall withstand 3,000 pounds compression per square inch at twenty-eight days.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors in concrete and beam clamps on structural steel.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to ceiling systems, piping, ductwork, mechanical equipment, or conduit, unless otherwise noted.
- D. Do not use powder-actuated anchors without specific permission.

- E. Do not drill structural steel members.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- G. In wet locations and on all building floors below exterior earth grade install free-standing electrical equipment on concrete pads.
- H. Install cabinets and panelboards with minimum of four anchors. Provide horizontal backing/support framing in stud walls for rigid mounting. Provide steel channel supports to stand surface-mounted panelboard or cabinet one inch off wall.
- I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.
- J. Do not exceed 25 lbs. per hanger and a minimum spacing of 2'-0" on center when attaching to metal roof decking (excludes concrete on metal deck). This 25 lbs. load and 2'-0" spacing include adjacent electrical and mechanical items hanging from deck. If the hanger restrictions cannot be achieved, supplemental framing off steel framing will need to be added.
- K. Refer to Section 26 05 33 for special conduit supporting requirements.

3.2 FINISH

- A. Prime coat exposed steel hangers and supports. Hangers and supports in crawl spaces, pipe shafts, and above suspended ceiling spaces are not considered exposed.
- B. Trim all ends of exposed field fabricated steel hangers, slotted channel and threaded rod to within 1" of support or fastener to eliminate potential injury to personnel unless shown otherwise on the drawings. Smooth ends and install elastomeric insulation with two coats of latex paint if exposed steel is within 6'-6" of finish floor and presents potential injury to personnel.

END OF SECTION

SECTION 26 05 33

CONDUIT AND BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Rigid metallic conduit and fittings (RMC)
- B. Intermediate metallic conduit and fittings (IMC)
- C. Electrical metallic tubing and fittings (EMT)
- D. Flexible metallic conduit and fittings (FMC)
- E. Liquidtight flexible metallic conduit and fittings (LFMC)
- F. Rigid polyvinyl chloride conduit and fittings (PVC)
- G. Wall and ceiling outlet boxes
- H. Electrical connection
- I. Pull and junction boxes
- J. Rough-ins
- K. Handholes
- L. Accessories

1.2 RELATED WORK

- A. Section 26 05 53 – Electrical Identification: Refer to electrical identification for color and identification labeling requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated
 - 2. ANSI C80.3 - Electrical Metallic Tubing, Zinc-Coated and Fittings
 - 3. ANSI C80.4 - Fittings for Rigid Metal Conduit and Electrical Metallic Tubing
 - 4. ANSI C80.6 – Intermediate Metal Conduit, Zinc Coated
 - 5. ANSI/NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports
 - 6. ANSI/NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
- B. Federal Specifications (FS):
 - 1. A–A–50553A – Fittings for Conduit, Metal, Rigid, (Thick-Wall and Thin-Wall (EMT) Type
 - 2. A–A–55810 – Specification for Flexible Metal Conduit
- C. NECA “Standards of Installation”
- D. National Electrical Manufacturers Association (NEMA):
 - 1. ANSI/NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable
 - 2. RN 1 – Polyvinyl chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
 - 3. TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit
 - 4. TC 9 – Fittings for PVC Plastic Utilities Duct for Underground Installation

- E. California Electrical Code (CEC)
- F. Underwriters Laboratories (UL): Applicable Listings
 - 1. UL 1 – Flexible Metal Conduit
 - 2. UL 6 – Rigid Metal Conduit
 - 3. UL 360 – Liquid Tight Flexible Steel Conduit
 - 4. UL514-B – Conduit Tubing and Cable Fittings
 - 5. UL651-A – Type EB and a PVC Conduit and HDPE Conduit
 - 6. UL651-B – Continuous Length HDPE Conduit
 - 7. UL746A – Standard for Polymeric Materials – Short Term Property Evaluations
 - 8. UL797 – Electrical Metal Tubing
 - 9. UL1242 – Intermediate Metal Conduit
- G. American Standard of Testing and Materials (ASTM):
 - 1. ASTM D 570 - Standard Test Method for Water Absorption of Plastics
 - 2. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics
 - 3. ASTM D 648 - Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edge Wise Position
 - 4. ASTM D 2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
 - 5. ASTM D 2447 - Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter
 - 6. ASTM D 3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Material
- H. Definitions:
 - 1. Fittings: Conduit connection or coupling.
 - 2. Body: Enlarged fittings with opening allowing access to the conductors for pulling purposes only.
 - 3. Mechanical Spaces: Enclosed areas, usually kept separated from the general public, where the primary use is to house service equipment and to route services. These spaces generally have exposed structures, bare concrete and non-architecturally emphasized finishes.
 - 4. Finished Spaces: Enclosed areas where the primary use is to house personnel and the general public. These spaces generally have architecturally emphasized finishes, ceilings and/or floors.
 - 5. Concealed: Not visible by the general public. Often indicates a location either above the ceiling, in the walls, in or beneath the floor slab, in column coverings, or in the ceiling construction.
 - 6. Above Grade: Not directly in contact with the earth. For example, an interior wall located at an elevation below the finished grade shall be considered above grade but a wall retaining earth shall be considered below grade.
 - 7. Slab: Horizontal pour of concrete used for a floor or sub-floor.

1.4 SUBMITTALS

- A. Include fittings and conduits 1.5" and larger in coordination files. Include all in--floor and underfloor conduit in coordination files. Refer to Section 26 05 00 for coordination drawing requirements.

PART 2 - PRODUCTS

2.1 RIGID METALLIC CONDUIT (RMC) AND FITTINGS

- A. Acceptable Manufacturers:
 - 1. Acceptable Manufacturers: Allied, LTV, Steelduct, Wheatland Tube Co, O-Z Gedney, or approved equal.
 - 2. Acceptable Manufacturers of RMC Conduit Fittings: Appleton Electric, O-Z/Gedney Co., Electroline, Raco, Bridgeport, Midwest, Regal, Thomas & Betts, Crouse-Hinds, Killark, or approved equal.
- B. Minimum Size Galvanized Steel: 3/4 inch (19mm), unless otherwise noted.
- C. Fittings and Conduit Bodies:
 - 1. End Bell Fittings: Malleable iron, hot dip galvanized, threaded flare type with provisions for mounting to form.
 - 2. Expansion Joints: Malleable iron and hot dip galvanized providing a minimum of 4 inches of movement. Fitting shall be watertight with an insulating bushing and a bonding jumper.
 - 3. Expansion Joint for Concrete Encased Conduit: Neoprene sleeve with bronze end coupling, stainless steel bands and tinned copper braid bonding jumper. Fittings shall be watertight and concrete-tight.
 - 4. Conduit End Bushings: Malleable iron type with molded-on high impact phenolic thermosetting insulation. Where required elsewhere in the contract documents, bushing shall be complete with ground conductor saddle and clamp. **High impact phenolic threaded type bushings are not acceptable.**
 - 5. All other fittings and conduit bodies shall be of malleable iron construction and hot dip galvanized.
- D. PVC Externally Coated Conduit: Compliant with UL 6, ANSI C80.1 and NEMA RN 1; rigid galvanized steel conduit with external 40 mil PVC coating and internal 2 mil urethane coating surface. All fittings and conduit bodies shall be complete with coating. Threads shall be hot galvanized and coated with a clear coat of urethane. The PVC coated system shall include necessary PVC coated fittings, boxes and covers to form a complete encapsulated system. Acceptable Manufacturers: Robroy, T&B Ocal or approved equal.

2.2 INTERMEDIATE METALLIC CONDUIT (IMC) AND FITTINGS

- A. Minimum Size Galvanized Steel: 3/4 inch, unless otherwise noted.
- B. Acceptable Manufacturers: Allied, LTV, Steelduct, Wheatland Tube Co, O-Z Gedney, or approved equal.

C. Fittings and Conduit Bodies:

1. End Bell Fittings: Malleable iron, hot dip galvanized, threaded flare type with provisions for mounting to form.
2. Expansion Joints: Malleable iron and hot dip galvanized providing a minimum of 4 inches of movement. Fitting shall be watertight with an insulating bushing and a bonding jumper.
3. Expansion Joint for Concrete Encased Conduit: Neoprene sleeve with bronze end coupling, stainless steel bands and tinned copper braid bonding jumper. Fittings shall be watertight and concrete-tight.
4. Conduit End Bushings: Malleable iron type with molded-on high impact phenolic thermosetting insulation. Where required elsewhere in the contract documents, bushing shall be complete with ground conductor saddle and clamp.
5. All other fittings and conduit bodies shall be of malleable iron construction and hot dip galvanized.

2.3 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Minimum Size Electrical Metallic Tubing: 3/4 inch, unless otherwise noted.
- B. Acceptable Manufacturers of EMT Conduit: Allied, LTV, Steelduct, Wheatland Tube Co, or approved equal.
- C. Fittings and Conduit Bodies:
 1. 2" Diameter or Smaller: Compression type of steel designed for their specific application.
 2. 1/2" and 3/4" Conduit: Push-on connectors and couplers with locking ring and washer of zinc plated steel, listed for use in dry locations.
 3. Larger than 2": Compression type of steel designed for their specific application.
 4. Acceptable Manufacturers of EMT Conduit Fittings: Appleton Electric, O-Z/Gedney Co., Electroline, Raco, Bridgeport, Midwest, Regal, Thomas & Betts, or approved equal.

2.4 FLEXIBLE METALLIC CONDUIT (FMC) AND FITTINGS

- A. Minimum Size Galvanized Steel: 3/4 inch, unless otherwise noted. Lighting branch circuit wiring to an individual luminaire may be a manufactured, UL listed 3/8" flexible metal conduit and fittings with #14 AWG THHN conductors and an insulated ground wire. Maximum length of 3/8" FMC shall be six (6) feet.
- B. Acceptable Manufacturers: American Flex, Alfex, Electri-Flex Co, or approved equal.
- C. Construction: Flexible steel, approved for conduit ground, zinc coated, threadless type formed from a continuous length of spirally wound, interlocked zinc coated strip steel. Provide a separate equipment grounding conductor when used for equipment where flexibility is required.

D. Fittings and Conduit Bodies:

1. Threadless hinged clamp type, galvanized zinc coated cadmium plated malleable cast iron.
2. Fittings and conduit bodies shall include plastic or cast metal inserts supplied by the manufacturer to protect conductors from sharp edges.
3. Acceptable Manufacturers: O-Z/Gedney Co., Thomas & Betts, Appleton Electric, Electroline, Bridgeport, Midwest, Regal, or approved equal.

2.5 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC) AND FITTINGS

- A. Acceptable Manufacturers: Anaconda Type UA, Electri-Flex Type LA, Alflex, Carlon (Lamson & Sessions), or approved equal.
- B. Construction: Flexible steel, approved for conduit ground, zinc coated, threadless type formed from a continuous length of spirally wound, interlocked zinc coated strip steel and an extruded PVC cover.
- C. Fittings and Conduit Bodies:
 1. Watertight, compression type, galvanized zinc coated cadmium plated malleable cast iron, UL listed.
 2. Fittings and conduit bodies shall include plastic or cast metal inserts supplied by the manufacturer to protect conductors from sharp edges.
 3. Acceptable Manufacturers: Appleton Electric, O-Z/Gedney Co., Electroline, Bridgeport, Thomas & Betts, Midwest, Regal, Carlon (Lamson & Sessions), or approved equal.

2.6 RIGID NON-METALLIC CONDUIT (PVC) AND FITTINGS

- A. Minimum Size Rigid Smooth-Wall Nonmetallic Conduit: 3/4 inch, unless otherwise noted.
- B. Acceptable Manufacturers: Carlon (Lamson & Sessions) Type 40, Cantex, J.M. Mfg., or approved equal.
- C. Construction: Schedule 40 and Schedule 80 rigid polyvinyl chloride (PVC), UL labeled for 90°C.
- D. Fittings and Conduit Bodies: NEMA TC 3; sleeve type suitable for and manufactured especially for use with the conduit by the conduit manufacturer.
- E. Plastic cement for joining conduit and fittings shall be provided as recommended by the manufacturer.

2.7 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1; galvanized steel, minimum of 14 gauge, with 1/2-inch male fixture studs where required.
- B. Nonmetallic Outlet Boxes: ANSI/NEMA OS 2.

- C. Cast Boxes: NEMA FB1, Type FD, Aluminum or cast ferrous alloy, deep type, gasketed cover, threaded hubs.
- D. Outlet boxes for luminaires to be not less than 1-1/2" deep, deeper if required by the number of wires or construction. The box shall be coordinated with surface luminaires to conceal the box from view or provide a finished trim plate.
- E. Switch outlet boxes for local light control switches, dimmers and occupancy sensors shall be 4 inches square by 2-1/8 inches deep, with raised cover to fit flush with finish wall line. Multiple gang switch outlets shall consist of the required number of gang boxes appropriate to the quantity of switches comprising the gang. Where walls are plastered, provide a plaster raised cover. Where switch outlet boxes occur in exposed concrete block walls, boxes shall be installed in the block cavity with a raised square edge tile cover of sufficient depth to extend out to face of block or masonry boxes.
- F. Outlet boxes for telephone substations in walls and columns shall be 4 inches square and 2-1/8 inches deep with single gang raised cover to fit flush with finished wall line equipped with flush telephone plate.
- G. Wall or column receptacle outlet boxes shall be 4 inches square with raised cover to fit flush with finished wall line. Boxes in concrete block walls shall be installed the same as for switch boxes in block walls.

2.8 ELECTRICAL CONNECTION

- A. Electrical connection to equipment and motors, sized per CEC. Coordinate requirements with contractor furnishing equipment or motor. Refer to specifications and general installation notes for terminations to motors.

2.9 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: ANSI/NEMA OS 1; galvanized steel.
- B. Sheet metal boxes larger than 12 inches in any dimension that contain terminations or components: Continuous hinged enclosure with 1/4 turn latch and white back panel for mounting terminal blocks and electrical components.
- C. Cast Metal Boxes for Outdoor and Wet Location Installations: NEMA 250; Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.
- D. Cast Metal Boxes for Underground Installations: NEMA 250; Type 4, inside flanged, recessed cover box for flush mounting, UL listed as raintight. Galvanized cast iron box and plain cover with neoprene gasket and stainless steel cover screws.
- E. Flanged type boxes shall be used where installed flush in wall.

2.10 ROUGH-IN

- A. Provide with one (1) flush mount double gang box with single gang plaster ring and appropriate cover plate,
- B. Conduit stubbed to above the lay-in ceiling.

C. Technology Rough-in:

1. Rough-in shall have one (1) 1" conduit.

D. Technology Rough-in - Wall Phone:

1. Mount on wall +48" or as noted in plans. Rough-in shall have one (1) 1" conduit.

E. Television Antenna Outlet Box Rough-in:

1. Rough-in shall have one (1) 3/4" conduit.

2.11 HANDHOLES

A. Handhole, composite polymer concrete body and cover. Stainless steel hardware. Bolted non-skid cover rated for 5,000 pounds. Design load occasional non-deliberate vehicular traffic. Stack units to achieve depth shown on plans. Units in landscaped areas shall be green in color. Dimensions as shown on plans.

1. Approved Manufacturers:

- a. Hubbell/Quazite
- b. Carson Industries H Series
- c. Armorcast
- d. Highline Products
- e. Synertech

B. Handhole, cast iron, hot dipped galvanized with checkered cover sidewalk weatherproof box, flat neoprene cover gasket. Stainless steel screw hardware. Mounted flush in concrete. Dimensions as shown on plans.

1. Approved Manufacturers:

- a. Appleton Electric WYT Series, WYT 181212
- b. OZ Gedney YT Series
- c. Crouse Hinds WJBF Series

C. Handhole, concrete traffic box and galvanized steel checkered cover. Stainless steel hardware. Bolted cover and box rated for H/20 vehicular traffic. Reinforced concrete slab for bottom. Dimensions as shown on plans.

1. Approved Manufacturer: Oldcastle Precast B1017 Box

2.12 ACCESSORIES

A. Fire Rated Moldable Pads: UL #9700, moldable sheet putty at required thickness on all five sides of back boxes. Kinetics Noise Control – IsoBacker Pad, SpecSeal – SSP Putty and Pads, 3M #MPP-4S or equal.

PART 3 - EXECUTION

3.1 CONDUIT SIZING

A. Size conduit as shown on the drawings and specifications. Where not indicated in the contract documents, conduit size shall be according to CEC. Conduit and conductor

sizing shall be coordinated to limit conductor fill to less than 40%, maintain conductor ampere capacity as required by the CEC (to include enlarged conductors due to temperature and quantity derating values) and to prevent excessive voltage drop and pulling tension due to long conduit/conductor lengths.

B. Minimum Conduit Size (Unless Noted Otherwise):

1. Above Grade: 3/4 inch. (The use of 1/2 inch would be allowed for installation conduit to individual light switches, individual receptacles and individual fixture whips from junction box.)
2. Below Grade 5' or less from Building Foundation: 1 inch.
3. Below Grade More than 5' from Building Foundation: 1 inch.
4. Telecommunication Conduit: 1 inch.
5. Controls Conduit: 3/4 inch.

C. Maximum Conduit Size Embedded in Slabs above Grade: 1-1/4 inch for conduits crossing each other.

D. Conduit sizes shall change only at the entrance or exit to a junction box, unless specifically noted on the drawings.

3.2 CONDUIT ARRANGEMENT

- A. In general, conduit shall be installed concealed in walls, in finished spaces and where possible or practical, or as noted otherwise. Conduit shall be installed parallel or perpendicular to walls, ceilings, and exposed structural members. In unfinished spaces, mechanical and utility areas, conduit may run either concealed or exposed as conditions dictate and as practical unless noted otherwise on drawings. Installation shall maintain headroom in exposed vicinities of pedestrian or vehicular traffic.
- B. Exposed conduit on exterior walls or above roof will not be allowed without prior written approval of Architect/Engineer. A drawing of the proposed routing and a photo of the location shall be submitted 14 days prior to start of conduit rough-in. Routing shall be shown on coordination drawings.
- C. Conduit shall not share the same cell as structural reinforcement in masonry walls.
- D. Conduit runs shall be routed as shown on large scale drawings. Conduit routing on drawings scaled 1/4"=1'-0" or less shall be considered diagrammatic, unless noted otherwise. The correct routing, when shown diagrammatically shall be chosen by the Contractor based on information in the contract documents, in accordance with manufacturer's written instructions, applicable codes, the NECA's "Standard of Installation", in accordance with recognized industry standards, and coordinated with other contractors.
- E. Contractor shall adapt his work to the job conditions and make such changes as required and permitted by the Architect/Engineer, such as moving to clear beams and joists, adjusting at columns, avoiding interference with windows, etc., to permit the proper installation of other mechanical and/or electrical equipment.
- F. Contractor shall cooperate with all Contractors on the project. He shall obtain details of other Contractor's work to ensure fit and avoid conflict. Any expense due to the failure of This Contractor to do so shall be paid for in full by him. The other trades

involved as directed by the Architect/Engineer shall perform the repair of work damaged as a result of neglect or error by This Contractor. The resultant costs shall be borne by This Contractor.

3.3 CONDUIT SUPPORT

- A. Conduit runs installed above a suspended ceiling shall be properly supported. In no case shall conduit rest on the suspended ceiling construction, nor utilize ceiling support system for conduit support.
- B. Conduit shall not be supported from ductwork, water, sprinkler piping, or other non-structural members, unless approved by the Architect/Engineer. All supports shall be from structural slabs, walls, structural members, and bar joists, and coordinated with all other applicable contractors, unless noted otherwise.
- C. Conduit shall be held in place by the correct size of galvanized one-hole conduit clamps, two-hole conduit straps, patented support devices, clamp back conduit hangers, or by other means if called for on the drawings.
- D. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- E. Spring-steel conduit clips specifically designed for supporting single conduits or tubing may be used in lieu of malleable-iron hangers for 1" and smaller raceways serving lighting and receptacle branch circuits above accessible ceilings and for securing raceways to slotted channel and angle supports.
- F. Group conduits in parallel runs where practical and use conduit racks or trapeze hangers constructed of steel channel, suspended with threaded solid rods or wall mounted from metal channels with conduit straps or clamps. Provide space in each rack or trapeze for 25% additional conduits.
- G. Do not exceed 25 lbs. per hanger and a minimum spacing of 2'-0" on center when attaching to metal roof decking (excludes concrete on metal deck). This 25 lbs. load and 2'-0" spacing include adjacent electrical and mechanical items hanging from deck. If the hanger restrictions cannot be achieved, supplemental framing off steel framing will need to be added.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Supports for metallic conduit shall be no greater than 10 feet. A smaller interval may be used if necessitated by building construction, but in no event shall support spans exceed the CEC requirements. Conduit shall be securely fastened within 3 feet of each outlet box, junction box, device box, cabinet, or fitting.
- J. Supports of flexible conduit shall be within 12 inches of each outlet box, junction box, device box, cabinet, or fitting and at intervals not to exceed 4.5 feet.
- K. Supports for non-metallic conduit shall be at sufficiently close intervals to eliminate any sag in the conduit. The manufacturer's recommendations shall be followed, but in no event shall support spans exceed the CEC requirements.
- L. Where conduit is to be installed in poured concrete floors or walls, provide concrete-tight conduit inserts securely fastened to forms to prevent conduit misplacement.

M. Finish:

1. Prime coat exposed steel hangers and supports. Hangers and supports in crawl spaces, pipe shafts, and above suspended ceiling spaces are not considered exposed.
2. Trim all ends of exposed field fabricated steel hangers, slotted channel and threaded rod to within 1" of support or fastener to eliminate potential injury to personnel unless shown otherwise on the drawings. Smooth ends and install elastomeric insulation with two coats of latex paint if exposed steel is within 6'-6" of finish floor and presents potential injury to personnel.

3.4 CONDUIT INSTALLATION

A. Conduit Connections:

1. Shorter than standard conduit lengths shall be cut square using industry standards. The ends of all conduits cut shall be reamed or otherwise finished to remove all rough edges.
2. Metallic conduit connections in slab on grade installation shall be sealed and one coat of rust inhibitor primer applied after the connection is made.
3. Where conduits with tapered threads cannot be coupled with standard couplings, then approved split or Erickson couplings shall be used. Running threads will not be permitted.
4. Install expansion/deflection joints where conduit crosses structure expansion/seismic joints.

B. Conduit terminations for all low voltage wiring shall have nylon bushings installed on each end of every conduit run.

C. Conduit Bends:

1. Use a hydraulic one-shot conduit bender or factory elbows for bends in conduit 2" in size or larger. All steel conduit bending shall be done cold; no heating of steel conduit shall be permitted.
2. All bends of rigid polyvinyl chloride conduit (PVC) shall be made with the manufacturer's approved bending equipment. The use of spot heating devices will not be permitted (i.e. blow torches).
3. A run of conduit shall not contain more than the equivalent of four (4) quarter bends (360°), including those bends located immediately at the outlet or body.
4. Telecommunications conduits shall have no more than two (2) 90-degree bends between pull points and contain no continuous sections longer than 100 feet. Insert pull points or pull boxes for conduits exceeding 100 feet in length.
 - a. A third bend is acceptable if:
 - 1) The total run is not longer than (33) feet.
 - 2) The conduit size is increased to the next trade size.
5. Telecommunications pull boxes shall not be used in lieu of a bend. Align conduits that enter the pull box from opposite ends with each other. Pull box

size shall be twelve (12) times the diameter of the largest conduit. Slip sleeves or gutters can be used in place of a pull box.

6. Telecommunications conduit bend radius shall be six (6) times the diameter for conduits under 2" and ten (10) times the diameter for conduits over 2".
7. Rigid polyvinyl chloride conduit (PVC) runs longer than 100 feet or runs which have more than two 90° equivalent bends (regardless of length) shall use rigid metal or RTRC factory elbows for bends.
8. Use conduit bodies to make sharp changes in direction (i.e. around beams).

D. Conduit Placement:

1. Conduit shall be mechanically continuous from source of current to all outlets. Conduit shall be electrically continuous from source of current to all outlets, unless a properly sized grounding conductor is routed within the conduit. All metallic conduits shall be bonded per the CEC.
2. Route exposed conduit and conduit above suspended ceilings (accessible or not) parallel/perpendicular to the building structural lines, and as close to building structure as possible. Wherever possible, route horizontal conduit runs above water and steam piping.
3. Route conduit through roof openings provided for piping and ductwork where possible. If not provided or routing through provided openings is not possible, route through roof jack with pitch pocket. Coordinate roof penetrations with other trades.
4. Conduits, raceway, and boxes shall not be installed in concealed locations in metal deck roofing or less than 1.5" below bottom of roof decking.
5. Avoid moisture traps where possible. Where unavoidable, provide a junction box with drain fitting at conduit low point.
6. All conduits through walls shall be grouted or sealed into openings. Where conduit penetrates firewalls and floors, seal with a UL listed sealant. Seal penetrations with intumescent caulk, putty, or sheet installed per manufacturer's recommendations. All materials used to seal penetrations of firewalls and floors shall be tested and certified as a system per ASTM E814 Standard for fire tests or through-penetration fire stops as manufactured by 3M or approved equal.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN MASONRY OR EXTERIOR WALLS UNDER THIS DIVISION. A QUALIFIED MASON AT THE EXPENSE OF THIS CONTRACTOR SHALL REPAIR ALL OPENINGS TO MATCH EXISTING CONDITIONS.
8. Seal interior of conduit at exterior entries, air handling units, coolers/freezers, etc., and where the temperature differential can potentially be greater than 20°F, to prevent moisture penetration. Seal shall be placed where conduit enters warm space. Conduit seal fitting shall be a drain/seal, with sealing compound, equal to O-Z/Gedney type EYD.

9. Horizontal conduit routing through slabs above grade
 - a. Conduits, if run in concrete structure, shall be in middle one-third of slab thickness, and leave at least 3" min. concrete cover. Conduits shall run parallel to each other and spaced at least 8" apart centerline to centerline. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement. Maximum conduit outside diameter 1".
 - b. No conduits are allowed in concrete on metal deck unless expressly approved in writing by the Structural Engineer.
 - c. No conduits are allowed to be routed horizontally through slabs above grade.
10. Do not route conduits across each other in slabs on grade.
11. Rigid polyvinyl chloride conduit (PVC) shall be installed when material surface temperatures and ambient temperature are greater than 40°F.
12. Where rigid polyvinyl chloride conduit (PVC) is used below grade, in a slab, below a slab, etc., a transition to rigid galvanized steel or PVC-coated steel conduit shall be installed before conduit exits earth. The metallic conduit shall extend a minimum of 6" into the surface concealing the non-metallic conduit.
13. Contractor shall provide suitable mechanical protection around all conduits stubbed out from floors, walls or ceilings during construction to prevent bending or damaging of stubs due to carelessness with construction equipment.
14. Contractor shall provide a polypropylene pull cord with 2000 lbs. tensile strength in each empty conduit (indoor and outdoor), except in sleeves and nipples.
15. Telecommunications conduits that protrude through the structural floor shall be installed 1 to 3" above finished floor (AFF).
16. Telecommunications conduits that enter into Telecommunications rooms below the finished ceiling shall terminate a minimum of 4" below ceiling and as close to the wall as possible.
17. Telecommunications conduits that are below grade and enter into a building shall terminate a minimum of 4" above finished floor (AFF) and as close to the wall as possible.

3.5 CONDUIT TERMINATIONS

- A. Where conduit bonding is indicated or required in the contract documents, the bushings shall be a grounding type sized for the conduit and ground bonding conductor as manufactured by O-Z/Gedney, Appleton, Thomas & Betts, Burndy, Regal, or approved equal.
- B. Conduits with termination fittings shall be threaded for one (1) lock nut on the outside and one (1) lock nut and bushing on the inside of each box.

- C. Where conduits terminate in boxes with knockouts, they shall be secured to the boxes with lock nuts and provided with approved screw type tinned iron bushings or fittings with plastic inserts.
- D. Where conduits terminate in boxes, fittings, or bodies with threaded openings, they shall be tightly screwed against the shoulder portion of the threaded openings.
- E. Conduit terminations to all motors shall be made with flexible metallic conduit (FMC), unless noted otherwise. Final connections to roof exhaust fans, or other exterior motors and motors in damp or wet locations shall be made with liquidtight flexible metallic conduit (LFMC). Motors in hazardous areas, as defined in the CEC, shall be connected using flexible conduit rated for the environment. Flexible conduit shall not exceed 6' in length. Route equipment ground conductors from circuit ground to motor ground terminal through flexible conduit.
- F. Rigid polyvinyl chloride conduit (PVC) shall be terminated using fittings and bodies produced by the manufacturer of the conduit, unless noted otherwise. Prepare conduit as per manufacturer's recommendations before joining. All joints shall be solvent welded by applying full even coat of plastic cement to the entire areas that will be joined. Turn the conduit at least a quarter to one half turn in the fitting and let the joint cure for 1-hour minimum or as per the manufacturer's recommendations.
- G. All conduit ends shall be sealed with plastic immediately after installation to prevent the entrance of any foreign matter during construction. The seals shall be removed and the conduits blown clear of all foreign matter prior to any wires or pull cords being installed.

3.6 UNDERGROUND CONDUIT INSTALLATION

- A. Conduit Connections:
 - 1. Conduit joints in a multiple conduit run shall be staggered at least one foot apart.
- B. Conduit Bends (Lateral):
 - 1. Conduits shall have long sweep radius elbows instead of standard elbows wherever special bends are indicated and noted on the drawings, or as required by the manufacturer of the equipment or system being served.
 - 2. Telecommunications conduit bend radius shall be six times the diameter for conduits under 2" and ten times the diameter for conduits over 2". Where long cable runs are involved, sidewall pressures may require larger radius bends. Coordinate with Architect/Engineer prior to conduit installation to determine bend radius.
- C. Conduit Elbows (vertical):
 - 1. Minimum metal or RTRC elbow radiuses shall be 30 inches for primary conduits (>600V) and 18 inches for secondary conduits (<600V). Increase radius, as required, based on pulling tension calculation requirements.
- D. Conduit Placement:
 - 1. Conduit runs shall be pitched a minimum of 4" per 100 feet to drain toward the terminations. Duct runs shall be installed deeper than the minimum wherever required to avoid any conflicts with existing or new piping, tunnels, etc.

2. For parallel runs, use suitable separators and chairs installed not greater than 4' on centers. Band conduit together with suitable banding devices. Securely anchor conduit to prevent movement during concrete placement or backfilling.
3. Where concrete is required, the materials for concreting shall be thoroughly mixed to a minimum $f'_c = 2500$ and immediately placed in the trench around the conduits. No concrete that has been allowed to partially set shall be used.
4. Before the Contractor pulls any cables into the conduit he shall have a mandrel 1/4" smaller than the conduit inside diameter pulled through each conduit and if any concrete or obstructions are found, the Contractor shall remove them and clear the conduit. Spare conduit shall also be cleared of all obstructions.
5. Conduit terminations in manholes, masonry pull boxes, or masonry walls shall be with malleable iron end bell fittings.
6. All spare conduits not terminated in a covered enclosure shall have its terminations plugged as described above.
7. Ductbanks and conduit shall be installed a minimum of 24" below finished grade, unless otherwise noted on the drawings or elsewhere in these specifications.
8. All non-metallic conduit installed underground outside of a slab shall be rigid.

E. Horizontal Directional Drilling:

1. Entire drill path shall be accurately surveyed, with entry and exit stakes placed and coordinated with other contractors. If using a magnetic guidance system, entire drill path shall be surveyed for any surface geo-magnetic variations or anomalies.
2. Any utility locates within 20 feet of the bore path shall have the exact location physically verified by hand digging or vacuum excavation. Restore inspection holes to original condition after verification.

F. Raceway Seal:

1. Where a raceway enters a building or structure, it shall be sealed with a sealing bushing or duct seal to prevent the entry of liquids or gases. Seal must be compatible with conductors and raceway system. Spare or unused raceway shall also be sealed.
2. All telecommunications conduits and innerducts, including those containing cables, shall be plugged at the building and vault with "JackMoon" or equivalent duct seal, capable of withstanding a 10-foot head of water (5 PSI).

3.7 CONDUIT INSTALLATION SCHEDULE

- A. In the event the location of conduit installation represents conflicting installation requirements as specified in the following schedule, a clarification shall be obtained from the Architect/Engineer. If This Contractor is unable to obtain a clarification as outlined above, concealed rigid galvanized steel conduit installed per these specifications and the CEC shall be required.

- B. The following schedule shall be adhered to unless they constitute a violation of applicable codes or are noted otherwise on the drawings. The installation of RMC conduit will be permitted in place of all conduit specified in this schedule.
1. Exposed:
 - a. Switchboards, panel feeders, etc.: IMC.
 - b. Branch Circuits (lighting, receptacles, controls, etc.): IMC.
 - c. Mechanical Equipment Feeders (pumps, AHUs, chillers, etc.): IMC.
 - d. Floor Mounted Pump Feeders: IMC with no more than 6' of PVC coated flexible metal conduit to pump.
 - e. Controls: IMC painted blue or dyed blue.
 2. Finished Spaces/Concealed: EMT.
 3. Wet or Damp Locations: RMC conduit, boxes and fittings, installed and equipped to prevent water from entering the conduit system.
 4. Corrosive Locations: PVC Coated Rigid Metal conduit, boxes and fittings installed and equipped to prevent water from entering the conduit system.
 5. In Slabs Above Grade: Embedded RMC.
 6. In or Under Slabs on Grade:
 - a. Within 5' from the perimeter of the building: PVC Schedule 40
 - b. Within 5' from the perimeter of the building when passing through the perimeter of the building foundation: Concrete encased PVC conduit with a minimum of 3" thickness between the surface of the concrete and the nearest conduit. Concrete to be doweled into the foundation.
 7. Site Conduits:
 - a. Within 5' from the Perimeter of a Building Foundation: Concrete encased PVC conduit with a minimum of 3" thickness between the surface of the concrete and the nearest conduit. Concrete to be doweled into the foundation.
 - b. 5' or Greater from the Perimeter of a Building Foundation: PVC Schedule 40.
 - c. Under Roads, Drives, and Vehicle Traveled Ways: PVC Schedule 40 or Schedule 80 PVC Directional boring: HDPE with pressurized grout backfill Concrete encased PVC with a minimum of 3" concrete cover on all sides of conduit.
 8. Interior Locations:
 - a. Exposed: IMC conduit.
 - 1) Exposed Controls Conduit: IMC painted blue or dyed blue.

- b. Concealed: EMT.
- 9. Fire Rated Assemblies:
 - a. Listed Fire Rated Assemblies: Phenolic RTRC
- 10. Hazardous Locations as Defined by the CEC: RMC conduit complete with screwed fittings and conduit seals.

3.8 BOX INSTALLATION SCHEDULE

- A. Galvanized steel boxes may be used in:
 - 1. Concealed interior locations above ceilings and in hollow stud partition walls.
 - 2. Exposed interior locations in mechanical rooms and in rooms without ceilings; higher than 8' above the highest platform level.
 - 3. Direct contact with concrete except slab on grade.
 - 4. Recessed in stud wall of kitchens and laundries.
- B. Cast boxes shall be used in:
 - 1. Exterior locations.
 - 2. Exposed interior locations within 8' of the highest platform level.
 - 3. Direct contact with earth.
 - 4. Direct contact with concrete in slab on grade.
 - 5. Wet locations.

3.9 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on the drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on the Contract Drawings are approximate, unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.
- C. Locate and install boxes to allow access. Avoid interferences with ductwork, piping, structure, equipment, etc. Where installation is inaccessible, provide access doors. Coordinate locations and sizes of required access doors with the Architect/Engineer and General Contractor.
- D. Locate and install to maintain headroom and to present a neat appearance.
- E. Coordinate locations with Heating Contractor to avoid baseboard radiation cabinets.

3.10 OUTLET BOX INSTALLATION

- A. Do not install boxes back-to-back in walls.
 - 1. Provide a minimum horizontal separation of 6 inches between boxes installed on opposite sides of non-rated stud walls. When the minimum separation cannot be maintained, install sound insulation pads on all five sides of the back box in accordance with the manufacturer's instructions.
 - 2. Provide a minimum horizontal separation of 24 inches between boxes installed on opposite sides of fire-rated walls. When the minimum separation cannot be maintained, the box is greater than 16 square inches or the total box area (all

trades) per 100 square feet is greater than or equal to 100 square inches, install fire-rated moldable pads to all five sides of the back box to maintain the fire rating of the wall. Install moldable pads in accordance with UL listing for the specific product. Sound insulation pads are not acceptable for use in fire-rated wall applications unless the product carries the necessary fire rating.

- B. Install sound insulation pads on all five sides of the back of all boxes in sound-rated wall assemblies. Sound-rated wall assemblies are defined as partition types carrying a Sound Transmission Class (STC) rating.
- C. The Contractor shall anchor switch and outlet box to wall construction so that it is flush with the finished masonry, paneling, drywall, plaster, etc. The Contractor shall check the boxes as the finish wall surface is being installed to assure that the box is flush. (Provide plaster rings as necessary.)
- D. Mount at heights shown or noted on the drawings or as generally accepted if not specifically noted.
- E. Locate boxes in masonry walls to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat openings for boxes.
- F. Provide knockout closures for unused openings.
- G. Support boxes independently of conduit.
- H. Use multiple-gang boxes where more than one device is mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- I. Install boxes in walls without damaging wall insulation.
- J. Coordinate mounting heights and locations of outlets mounted above counters, benches, backsplashes, and below baseboard radiation.
- K. Position outlets to locate luminaires as shown on reflected ceiling drawings.
- L. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.
- M. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioned to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
- N. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- O. Provide cast outlet boxes in exterior locations and wet locations, and where exposed rigid or intermediate conduit is used.

3.11 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

- C. Do not install boxes back-to-back in walls.
 - 1. Provide a minimum horizontal separation of 6 inches between boxes installed on opposite sides of non-rated stud walls. When the minimum separation cannot be maintained, install sound insulation pads on all five sides of the back box in accordance with the manufacturer's instructions.
 - 2. Provide a minimum horizontal separation of 24 inches between boxes installed on opposite sides of fire-rated walls. When the minimum separation cannot be maintained, the box is greater than 16 square inches or the total box area (all trades) per 100 square feet is greater than or equal to 100 square inches, install fire-rated moldable pads to all five sides of the back box to maintain the fire rating of the wall. Install moldable pads in accordance with UL listing for the specific product. Sound insulation pads are not acceptable for use in fire-rated wall applications unless the product carries the necessary fire rating.
- D. Install sound insulation pads on all five sides of the back of all boxes in sound-rated wall assemblies. Sound-rated wall assemblies are defined as partition types carrying a Sound Transmission Class (STC) rating.

3.12 EXPOSED BOX INSTALLATION

- A. Boxes shall be secured to the building structure with proper size screws, bolts, hanger rods, or structural steel elements.
- B. On brick, block and concrete walls or ceilings, exposed boxes shall be supported with no less than two (2) Ackerman-Johnson, Paine, Phillips, or approved equal screw anchors or expansion shields and round head machine screws. Cast boxes shall not be drilled.
- C. On steel structures, exposed boxes shall be supported to the steel member by drilling and tapping the member and fastening the boxes by means of round head machine screws.
- D. Boxes may be supported on steel members by APPROVED beam clamps if conduit is supported by beam clamps.
- E. Boxes shall be fastened to wood structures by means of a minimum of two (2) wood screws adequately large and long to properly support. (Quantity depends on size of box.)
- F. Wood, plastic, or fiber plugs shall not be used for fastenings.
- G. Explosive devices shall not be used unless specifically allowed.

END OF SECTION

SECTION 26 05 48

SEISMIC REQUIREMENTS FOR EQUIPMENT AND SUPPORTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Seismic Requirements.

1.2 QUALITY ASSURANCE

A. General:

1. The contractor shall retain a specialty consultant or equipment manufacturer to develop a seismic restraint and support system and perform seismic calculations in accordance with these specifications, state, and local codes.
2. Items used for seismic restraint of equipment and systems shall be specifically manufactured for seismic restraint.
3. These requirements are beyond those listed in Section 26 05 27 of these specifications. Where a conflict arises between the seismic requirements of this section and any other section, the Architect/Engineer shall be immediately notified for direction to proceed.

B. Manufacturer:

1. System Supports/Restraints: Company specializing in the manufacture of products specified in this Section.
2. Equipment: Each company providing equipment that must meet seismic requirements shall provide certification included in project submittals the equipment supplied for the project meets or exceeds the seismic requirements of the project.

C. Testing Agency: An independent testing agency, acceptable to Authorities Having Jurisdiction, with experience and capability to conduct the testing indicated.

D. Installer: Company specializing in performing the work of this Section.

E. Suppliers: Following is a partial list of manufacturer/supplier contact information for seismic restraints:

1. B-Line Systems, Inc. (800) 851-7415, www.b-line.com.
2. Unistrut Corporation <http://www.unistrut.us/>
3. Kinetics Noise Control (877) 457-2695, www.kineticsnoise.com.
4. Mason Industries, Inc. www.mason-ind.com.
5. Loos & Co., Inc. (800) 321-5667, www.loosnaples.com.
6. Tolco (909) 737-5599, www.tolco.com
7. ISAT 877.523.6060, www.isatsb.com
8. Vibro-Acoustics (416) 291-7371 , <https://virs.vibro-acoustics.com/>

1.3 REFERENCES

- A. California Building Code (CBC)
- B. California Office of Statewide Health Planning and Development (OSHPD)
- C. California Division of State Architect (DSA) Interpretation of Regulations
- D. ASHRAE - A Practical Guide to Seismic Restraint.
- E. ASCE 7-10, Chapter 13.

1.4 SUBMITTALS

- A. Submit product data.
- B. Shop Drawings:
 - 1. Calculations, restraint selections, and installation details shall be designed and sealed by a Professional Structural Engineer licensed in the state where the project is located experienced in seismic restraint design and installation.
 - 2. Coordination Drawings: Plans and sections drawn to scale, coordinating seismic bracing of electrical components with other systems and equipment in the vicinity, including other seismic restraints.
 - 3. Manufacturer's Certifications: Professional Structural Engineer licensed in the state where the project is located shall review and approve manufacturer's certifications of compliance.
 - 4. System Supports/Restraints - Submit for each condition requiring seismic bracing:
 - a. Calculations for each seismic brace and detail utilized on the project.
 - b. Plan drawings showing locations and types of seismic braces on contractor fabrication/installation drawings.
 - c. Cross-reference between details and plan drawings to indicate exactly which brace is being installed at each location. Details provided are to clearly indicate attachments to structure, correctly representing the fastening requirements of bracing.
 - d. Clear indication of brace design forces and maximum potential component forces at attachment points to building structure for confirmation of acceptability by the Structural Engineer of Record.
 - 5. Equipment - Submit for each piece of equipment supplied:
 - a. Certification that the equipment supplied for the project meets or exceeds the seismic requirements specified. Equipment certification is to be provided by the manufacturer
 - b. Specific details of seismic design features of equipment and maximum seismic loads imparted to the structural support.
 - c. Engineering calculations and details for equipment anchorage and support structure.

- C. A seismic restraint designer shall be provided whether or not exceptions listed in the applicable building code are met. If seismic restraints are not provided for a system that requires seismic bracing, the seismic designer shall submit a signed and sealed letter to the Architect/Engineer and Authorities Having Jurisdiction stating the exceptions, along with code reference, utilized for each item. Seismic designer shall review system installation for general conformance to the exception requirements stated in the code and document, in writing, the system has been installed in accordance to the exception.

1.5 TESTING AND INSPECTION

- A. Special Inspection and Testing shall be done in accordance with Chapter 17 of the California Building Code.
- B. Work performed on the premises of a fabricator approved by the building official need not be tested and inspected. The fabricator shall submit a certificate of compliance that the work has been performed in accordance with the approved plans and specifications to the building official and the Architect and Engineer of Record.
- C. The Special Inspection Agency shall furnish inspection reports to the building official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspected work. A final signed report stating whether the work requiring special inspection was, to the best of the Special Inspection Agency's knowledge, in conformance with the approved plans and specifications shall be submitted.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site. Accept material on site in factory containers and packing. Inspect for damage. Protect from damage and contamination by maintaining factory packaging until installation. Follow manufacturer's instructions for storage.

1.7 DESIGN REQUIREMENTS

- A. project shall comply to the seismic bracing requirements of California Building Code, and Division of State Architect (DSA) Interpretation of Regulations.
- B. Forces shall be calculated with the above requirements and Equation. Equipment shall meet California Building Code and ASCE 7 seismic qualification requirements in concurrence with ICC ES AC156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems.

1.8 COORDINATION

- A. Coordinate layout and installation of seismic bracing with building structural systems and architectural features, and with mechanical, fire-protection, electrical and other building features in the vicinity.
- B. Coordinate concrete bases with building structural system.

1.9 WARRANTY

- A. Provide one-year warranty on parts and labor for manufacturer defects and installation workmanship.

PART 2 - PRODUCTS

2.1 SEISMIC DESIGN CRITERIA

- A. This section describes the requirements for seismic restraint of systems and equipment related to continued operation of the facility after a design seismic event.
- B. Definitions
 - 1. Stay in Place:
 - a. All systems and equipment shall be anchored and restrained such that the anchoring system is intended not to fail and equipment and/or system components will not fall.

2.2 SEISMIC BRACING AND SUPPORT OF SYSTEMS AND COMPONENTS

- A. General:
 - 1. Seismic restraint designer shall coordinate all attachments with the Structural Engineer of Record; refer to submittal requirements.
 - 2. The seismic restraint design shall be based on actual equipment data obtained from manufacturer's submittals or the manufacturer. The equipment manufacturer shall verify and provide written certification the attachment points on the equipment can accept the combination of seismic, weight, and other imposed loads.
 - 3. Design analysis shall include calculated dead loads, static seismic loads, and capacity of materials utilized for the connection of the equipment or system to the structure.
 - 4. Analysis shall detail anchoring methods, bolt diameter, embedment, and weld length.
 - 5. All seismic restraint devices shall be designed to accept without failure the forces calculated per the applicable building code.
- B. Friction from gravity loads shall not be considered resistance to seismic forces.
- C. Housekeeping Pads:
 - 1. Reinforced housekeeping pads shall be provided to handle shear, tension, and compression forces with proper reinforcement, doweling, and attachments connecting the pad to the structural slab.

2.3 SEISMIC RESTRAINT AND CONSTRUCTION OF EQUIPMENT

- A. Equipment supplied for the project shall be designed to meet the requirements of lateral forces calculated using the applicable code and method described above.
- B. The following is a partial list of equipment that shall be restrained and that shall be constructed to meet seismic forces described in this section:
 - 1. Switchboards, Distribution Panelboards, Panelboards, Load Centers
 - 2. Disconnect Switches

3. Magnetic, Manual, Combination Starters
4. Fire Alarm Panel, Initiating and Notification Appliances
5. Intercom, Sound System, Clock, TV Distribution
6. Security System

2.4 MATERIALS

A. Use the following materials for restraints:

1. Indoor Dry Locations: Steel, zinc plated.
2. Outdoors and Damp Locations: Galvanized steel.
3. Corrosive Locations: Stainless steel.

2.5 ANCHORAGE AND STRUCTURAL ATTACHMENT COMPONENTS

A. Strength: Defined in reports by ICC Evaluation Service or another agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Strength in tension and shear of components used shall be at least two times the maximum seismic forces to which they will be subjected.

B. Concrete and Masonry Anchor Bolts and Studs: Steel-expansion wedge type. Comply with IBC, ACI and ICC ES requirements for cracked concrete anchors.

C. Concrete Inserts: Steel-channel type.

D. Through Bolts: Structural type, hex head, high strength. Comply with ASTM F3125, Grade A 325.

E. Welding Lugs: Comply with MSS SP-69, Type 57.

F. Beam Clamps for Steel Beams and Joists: Double sided. Single-sided type is not acceptable.

G. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to the type and size of anchor bolts and studs used.

H. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to the type and size of attachment devices used.

2.6 SEISMIC BRACING COMPONENTS

A. Slotted Steel Channel: 1-5/8-by-1-5/8-inch cross section, formed from 0.1046-inch-thick steel, with 9/16-by-7/8-inch slots at a maximum of 2 inches o.c. in webs, and flange edges turned toward web.

1. Materials for Channel: ASTM A 1011, GR 33.
2. Materials for Fittings and Accessories: ASTM A 635, ASTM A 576, or ASTM A 36.
3. Fittings and Accessories: Products of the same manufacturer as channels and designed for use with that product.

- 4. Finish: Baked, rust-inhibiting, acrylic-enamel paint applied after cleaning and phosphate treatment, unless otherwise indicated.
- B. Channel-Type Bracing Assemblies: Slotted steel channel, with adjustable hinged steel brackets and bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to the applicable code sections and Authority Having Jurisdiction for the exact seismic restraint requirements of conduit, equipment, etc.
- B. Layout of transverse and longitudinal bracing shall follow recommendations of approved design standards listed in Part 1 of this specification section.
- C. All rigid floor mounted equipment shall have a resilient media between the equipment mounting hole and the anchor bolt in concrete.
- D. All seismic restraint systems shall be installed in strict accordance with the manufacturer's written instructions and all certified submittal data.
- E. Installation of seismic restraints shall not cause any change in position of equipment lighting or conduits resulting in stresses or misalignment.
- F. No rigid connections between equipment and the building structure shall be made that degrade the noise and vibration-isolation system specified.
- G. Do not install any equipment or conduit that makes rigid connections with the building unless isolation is not specified.
- H. Coordinate work with all other trades to avoid rigid contact with the building. Any conflicts with other trades that will result in rigid contact with equipment or conduit due to inadequate space or other unforeseen conditions shall be brought to the Architect/Engineer's attention prior to specific equipment selection.
- I. Prior to installation, bring to the Architect/Engineer's attention any discrepancies between the specifications and the field conditions, or changes required due to specific equipment selection.
- J. Bracing may occur from flanges of structural beams, upper truss cords of bar joists, cast in place inserts, or International Code Council approved seismic anchors for installation in concrete.
- K. Cable restraints shall be installed slightly slack to avoid short-circuiting the isolated suspended equipment or conduit.
- L. Cable assemblies shall be installed taut on non-isolated systems. Solid braces may be used in place of cables on rigidly attached systems only.
- M. Do not install cables over sharp corners.
- N. Brace support rods when necessary to accept compressive loads. Welding of compression braces to the vertical support rods is not acceptable.

- O. Provide reinforced clevis bolts when required.
 - P. The vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not acceptable.
 - Q. Post-Installed anchors shall be provided to meet seismic requirements.
 - R. Vertical conduit risers flexibly supported to accommodate thermal motion and/or conduit vibration shall be guided to maintain conduit stability and provide horizontal seismic restraint.
 - S. Seismic restraints shall be mechanically attached to the system. Looping restraints around the system is not acceptable.
 - T. Conduit crossing building seismic or expansion joints, passing from building to building, or supported from different portions of the building shall be installed to allow differential support displacements without damaging the conduit, equipment connections, or support connections. Conduit offsets, loops, anchors, and guides shall be installed as required to provide required motion capability and limit motion of adjacent conduit.
 - U. Do not brace a system to two different structures such as a wall and a ceiling.
 - V. Provide appropriately sized openings in walls, floors, and ceilings for anticipated seismic movement. Provide fire seal systems in fire-rated walls.
 - W. Positively attach all roof-mounted equipment to roof curbs. Positively attach all roof curbs to building structure.
 - X. Exposed seismic supports in occupied areas shall be guarded or covered to protect occupants.
- 3.2 SEISMIC RESTRAINT EXCLUSIONS
- A. Refer to the applicable code sections and Authority Having Jurisdiction for allowable exclusions.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Adhesive labels, markings, nameplates, and signs
- B. Wire and cable markers
- C. Raceway, box, and wire identification
- D. Equipment short circuit current rating (SCCR) labeling
- E. Electrical equipment labeling
- F. Electrical working clearance identification
- G. Series rating identification

1.2 REFERENCES

- A. ANSI C2 – National Electrical Safety Code
- B. California Electrical Code (CEC)
- C. ANSI A13.1 – Standard for Pipe Identification
- D. ANSI Z535.4 – Standard for Product Safety Signs and Labels

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Division 1 Specification Sections and under provisions of Section 26 05 00.
 - 1. Product Data for each type of product specified.
 - 2. Schedule of nomenclature to be used for identification signs and labels for each piece of equipment including, but not limited to, the following equipment types as specified in Division 26.
 - 3. Samples of each color, lettering style and other graphic representation required for identification materials including samples of labels and signs.
 - 4. Identification required in this section shall apply to equipment furnished in Division 26 and any other applicable Divisions including Division 21/22/23.

PART 2 - PRODUCTS

2.1 ADHESIVE MARKINGS AND FIELD LABELS

- A. Adhesive Marking Labels for Raceway: Pre-printed, flexible, self-adhesive vinyl labels with legend indicating voltage and service (Emergency, Lighting, Power, HVAC, Communications, Control, Fire).
 - 1. Label Size as follows:
 - a. Raceways: Kroy or Brother labels 1-inch (25mm) high by 12-inches (305mm) long (minimum).
 - 2. Color: As specified for various systems.

- B. Colored Adhesive Marking Tape for banding Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch (25mm) to 2 inches (50mm) in width.
- C. Pretensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: flexible acrylic bands sized to suit the cable diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.
- D. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with preprinted numbers and letter.
- E. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch (5mm) minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50°F to 350°F (10°C to 176°C). Provide ties in specified colors when used for color coding.
- F. Underground Plastic Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4 mil thick, printed legend indicating type of underground line, manufactured for direct burial service. Tape shall contain a continuous metallic wire to allow location with a metal detector.
- G. Aluminum, Wraparound Marker Bands: 1-inch (25mm) width, 0.014 (5mm) inch thick aluminum bands with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- H. Brass or aluminum Tags: 2" (50mm) by 2" (50mm) by .05-inch (2mm) metal tags with stamped legend, punched for fastener.
- I. Indoor/Outdoor Number and Letters: Outdoor grade vinyl label with acrylic adhesive designed for permanent application in severe indoor and outdoor environments.
- J. Text Sizes:
 - 1. The following information shall be used for text heights, fonts, and size, unless otherwise noted.
 - a. Font: Normal 721 Swiss Bold
 - b. Adhesive Labels: 3/16 inch (5mm) minimum text height
 - c. Vinyl / Plastic Laminate Labels: 3/4" inch (19mm) minimum text height

2.2 NAMEPLATES AND SIGNS

- A. Engraved, Plastic-Laminated Labels, Signs and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch (2mm) minimum thick for signs up to 20 square inches (13 square cm), or 8 inches (200mm) in length; 1/8 inch (3mm) thick for larger sizes. Labels shall be punched for mechanical fasteners.
- B. Text Sizes:
 - 1. The following information shall be used for text heights, fonts, and size, unless otherwise noted.
 - a. Text Height: 3/8 inch (10mm) minimum
- C. Baked–Enamel Signs for interior Use: Preprinted aluminum signs, punched, or drilled for fasteners, with colors, legend, and size required for application. Mounting 1/4" grommets in corners.

- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396 inch (10mm) galvanized-steel backing; and with colors, legend, and size required for application. Mounting 1/4" grommets in corners.
- E. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- F. Fasteners for Plastic-Laminated Signs; Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.

2.3 PRODUCT COLORS

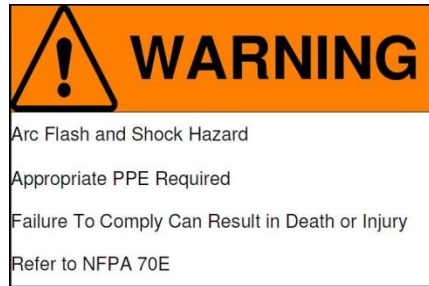
- A. Adhesive Markings and Field Labels:
 - 1. All Labels: Black letters on white face
 - 2. Normal Power and General Labels: Black letters on white face.
 - 3. Fire Alarm: Red letters on white face.
- B. Nameplates and Signs:
 - 1. NORMAL POWER: Black letters on white face
 - 2. GROUNDING: White letters on green face.
- C. Raceways and Conduit:
 - 1. Provide color coded conduit as indicated below. Conduit shall be colored by the manufacturer:
 - a. Normal Power and General Distribution: Silver
 - b. Fire Alarm System: Red
 - c. Temperature Controls: Blue
 - d. Ground: Green
 - e. Low Voltage and Telephone: Purple
 - f. Clock, Sound, Security System, and Intercom: Black
- D. Box Covers:
 - 1. Box covers shall be painted to correspond with system type as follows:
 - a. Normal Power and General: Silver
 - b. Fire Alarm System: Red
 - c. Temperature Controls: Blue
 - d. Ground: Green
 - e. Low Voltage and Telephone: Purple
 - f. Clock, Sound, Security System, and Intercom: Black
 - 2. Box cover colors shall match conduit colors listed above.
- E. Conductor Color Identification: Refer to Part 3 for additional information.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.
- B. Electrical System Color Chart: This Contractor shall furnish and install framed 8" x 12" charts of the color-coded identification scheme used for the electrical system in all electrical rooms and next to the main fire alarm panel.
- C. Install identification devices in accordance with manufacturer's written instruction and requirements of CEC.
- D. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work. All mounting surfaces shall be cleaned and degreased prior to identification installation.
- E. Circuit Identification: Tag or label conductors as follows:
 - 1. Multiple Power or Lighting Circuits in Same Enclosure: Where multiple branch circuits are terminated or spliced in a box or enclosure, label each conductor with source and circuit number.
 - 2. Multiple Control Wiring and Communication/Signal Circuits in Same Enclosure: For control and communications/signal wiring, use wire/cable marking tape at terminations in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tape.
 - 3. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.
- F. Apply warning, caution and instruction signs as follows:
 - 1. Install warning, caution or instruction signs where required by CEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- G. Apply circuit/control/item designation labels of engraved plastic laminate for pushbuttons, pilot lights, alarm/signal components, and similar items, except where labeling is specified elsewhere.
- H. Install labels parallel to equipment lines at locations as required and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

- I. Install ARC FLASH WARNING signs on all switchboards, panelboards, industrial control panels, and motor control centers. Sign at a minimum shall contain:



- J. Circuits with more than 600V: Identify raceway and cable with "DANGER—HIGH VOLTAGE" in black letters 2 (50mm) inches high on orange background at 10'-0 foot (3m) intervals.
1. Entire floor area directly above conduits running beneath and within 12 inches (305mm) of a basement or ground floor that is in contact with earth or is framed above unexcavated space.
 2. Wall surfaces directly external to conduits concealed within wall.
 3. All accessible surfaces of concrete envelope around conduits in vertical shafts, exposed in building, or concealed above suspended ceilings.
- K. Underground Electrical Lines: For exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 (150mm) to 8 (205mm) inches below grade. A single plastic line marker is permitted when the width of the common trench does not exceed 16 inches (405mm); provide a second plastic line marker to mark each edge of the trench when 16 inches (405mm) of width is exceeded.

3.2 LIGHTING CONTROL AND RECEPTACLE COVER PLATES

- A. Product:
1. Adhesive labels and field markings
 2. Nameplates and signs
- B. Identification material to be a clear, 3/8-inch (10mm) Kroy tape or Brother self-laminating vinyl label with black letters. Embossed Dymo-Tape labels are not acceptable. Permanently affix identification label to cover plates, centered above the receptacle openings.
- C. Identification material to be engraved plastic-laminated labels, 1/16-inch (2mm) minimum thickness with white letters on a red face. Letter and number size to 1/8-inch (3mm) high.
- D. Provide identification on all switch and receptacle cover plates. Identification shall indicate source and circuit number serving the device (e.g. "C1A #24"). Identification for switch cover plates shall be installed on the inside cover.

3.3 CONDUIT AND EXPOSED CABLE LABELING

- A. Product:
 - 1. Adhesive labels and field markings
- B. Conduit Identification: Pre-printed, flexible, self-adhesive vinyl labels with legend at 10 foot intervals to identify all conduits run exposed or located above accessible ceilings. Conduits located above non-accessible ceiling or in floors and walls shall be labeled within 3 feet of becoming accessible. Labels for multiple conduits shall be aligned. Refer to color requirements in Part 2 when applicable in addition to the following:
 - 1. 1000 Volt or less Normal/Emergency Power: Indicate feeder identification and voltage.
 - 2. Fire Alarm: Indicate "FIRE ALARM".
 - 3. Grounding: Indicate "GROUND" and equipment and designation.
 - 4. Security System: Indicate "Security".
 - 5. Telephone System: Indicate "Telephone".
- C. Blank conduit ends or outlet boxes for future extension of system shall have permanent identification marker indicating purpose of conduit or box and where the raceway originated.

3.4 CONDUIT AND RACEWAY COLOR BANDING FOR EXISTING CONDITIONS AND REMODELING

- A. Existing Conduit and Raceways: Identify existing conduits and raceways within the limits of the project boundary with color banding.
 - 1. Existing conduit and raceways to be color banded: 3/4 inch (19mm) and larger.
 - 2. The Contractor shall perform a review of the existing conduit, raceway, and system type prior to submitting a bid. The Contractor's review shall include a review of areas with non-finished ceilings and areas with accessible finished ceilings.
- B. New Conduit and Raceways: Identify new conduits and raceways with color banding. The following products and materials shall be identified with color banding when required by Part 1 of this specification.
 - 1. Rigid metallic conduit and fittings (RMC)
 - 2. Intermediate metallic conduit and fittings (IMC)
 - 3. Wire and cable installed with or without raceways:
 - a. Low voltage cabling
- C. Instructions:
 - 1. Band exposed or accessible raceways, cables, and bare conductors of the. Bands shall be pretensioned, snap-around colored plastic sleeves, colored adhesive marking tape, or a combination of the two. Make each color band 2 inches (50mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side. Refer to Part 1 of this specification for specific systems and colors requiring banding.
 - 2. Install bands at changes within 36 inches (1 meter) of direction changes, all wall/floor penetrations, at each junction box, and at 10-foot (3 meter) maximum intervals in straight runs.

3.5 BOX LABELING

A. Products:

1. Adhesive labels and field markings

B. Identify Junction, Pull and Connection Boxes: Labeling shall be 3/8-inch (10mm) Kroy tape or Brother self-laminating vinyl label, letters/numbers color coded same as conduits. In rooms that are painted out, provide labeling on inside of cover.

C. All junction, pull, and connection boxes shall be identified as follows:

1. For power and lighting circuits, indicate system voltage and identity of contained circuits ("120V, 1LA1-3,5,7").
2. For other wiring, indicate system type and description of wiring ("FIRE ALARM NAC #1").

3.6 CONDUCTOR COLOR CODING

A. Products:

1. All wire and cables shall be color coded by the manufacturer.
2. All wires and cables, 6 AWG or larger, used in motor circuits, main feeders, sub-main feeders, and branch circuits shall be coded by the application of plastic tape. The tape shall be 3-M, Plymouth or Permacel in colors specified below. The tape shall be applied at each conductor termination with two 1-inch (25mm) tape bands at 6-inch (150mm) centers. Contractor option to use colored cabling in lieu of the tape at each end for conductor 6 AWG to 500 KCM. Wire and cables smaller than 6 AWG shall be color coded by the manufacturer.

B. Color coding shall be applied at all panels, switches, junction boxes, pull boxes, vaults, manholes etc., where the wires and cables are visible and terminations are made. The same color coding shall be used throughout the entire electrical system, therefore maintaining proper phasing throughout the entire project.

C. Colored cable ties shall be applied in groups of three ties of specified color to each conductor at each terminal or splice point starting 3 inches (76mm) from the termination and spaced at 3- inches (76mm) centers. Tighten to a snug fit, and cut off excess length.

D. Where more than one nominal voltage system exists in a building or facility, each ungrounded conductor of a multi-wire branch circuit, where accessible, shall be identified by phase and system.

E. Conductors shall be color coded as follows:

1. 120/240 Volt, 3-Wire:
 - a. A-Phase – Black
 - b. B-Phase – Red
 - c. Neutral – White
 - d. Ground Bond – Green

2. 208Y/120 Volt, 4-Wire:
 - a. A-Phase – Black
 - b. B-Phase – Red
 - c. C-Phase – Blue
 - d. Neutral – White
 - e. Ground Bond – Green
3. 480Y/277 Volt, 4-Wire:
 - a. A-Phase – Brown
 - b. B-Phase – Orange
 - c. C-Phase – Yellow
 - d. Neutral – Gray
 - e. Ground Bond – Green
4. 120 Volt, 2-Wire Isolated (Ungrounded) Power System:
 - a. A-Phase – Orange with distinctive colored stripe other than white, green or gray along the entire length of the conductor
 - b. B-Phase – Brown with distinctive colored stripe other than white, green or gray along the entire length of the conductor
 - c. Ground Reference – Green
5. 120/208 Volt, 3-Wire, Isolated (Ungrounded) Power System:
 - a. A-Phase – Orange with distinctive colored stripe other than white, green or gray along the entire length of the conductor
 - b. B-Phase – Brown with distinctive colored stripe other than white, green or gray along the entire length of the conductor
 - c. C-Phase – Yellow with distinctive colored stripe other than white, green or gray along the entire length of the conductor
 - d. Ground Reference – Green
6. 60 to 1500 Volt, Direct Current DC Power System:
 - a. Positive Polarity: Red or black with permanent red stripe marked along the entire length. Provide shrink wrap sleeves at terminations indication (POS, POSITIVE, or POS (+)).
 - b. Negative Polarity: Black. Provide shrink wrap sleeves at terminations indication (NEG, NEGATIVE, or NEG (-)).
7. Isolated Equipment Ground Conductors: Green with colored distinctive yellow stripe along the entire length of the conductor.

3.7 CONTROL EQUIPMENT IDENTIFICATION

- A. Products:
 1. Nameplates and signs
- B. Provide identification on the front of all control equipment such as combination starters, starters, VFDs, contactors, motor control centers, etc.
- C. Identification shall be provided for all connections to equipment furnished by this Contractor, other contractors, or the Owner.

D. Labeling shall include:

1. Equipment type and contract documents designation of equipment being served.
2. Location of equipment being served if it is not located within sight.
3. Voltage and phase of circuit(s).
4. Panel and circuit number(s) serving the equipment.
5. Available fault current; refer to one-line diagram or panel schedule of panel serving equipment.
6. Date of fault current study, refer to one-line diagram

EXHAUST FAN EF-1
("LOCATED ON ROOF")
480V, 3-PHASE
FED FROM "1HA1-1"
AUTO CONTROL BY FCMS
22,000 AMPS AVAILABLE FAULT CURRENT
DATE OF STUDY: 1 JAN 2017

3.8 EQUIPMENT CONNECTION IDENTIFICATION

A. Products:

1. Nameplates and signs

B. Provide identification for hard wired electrical connections to equipment such as disconnects switches, starters, etc. Plug and cord type connections do not require this specific label.

C. Identification shall be provided for all connections to equipment furnished by this Contractor, other contractors, or the Owner. The following list of equipment is specifically being listed to receive an equipment connection label; this list does not limit the equipment that shall receive a label:

1. Mechanical heating, ventilation, and air conditioning equipment; chillers, boilers, pumps, air handling ventilation units, condensing units, unit heaters, and similar equipment
2. Plumbing equipment
3. Fire protection equipment including fire pumps

D. Labeling shall include:

1. Equipment type and contract documents designation of equipment being served
2. Location of equipment being served if it is not located within sight.
3. Voltage and rating of the equipment.
4. Panel and circuit numbers(s) serving the equipment
5. Available fault current; refer to one-line diagram or panel schedule of panel serving equipment.

6. Date of fault current study; refer to one-line diagram

UNIT HEATER UH-1
("LOCATED IN STORAGE ROOM 200")
480V: 3-PHASE
FED FROM "1HA1-1"
22,000 AMPS AVAILABLE FAULT CURRENT
DATE OF STUDY: 1 JAN 2017

3.9 POWER DISTRIBUTION EQUIPMENT IDENTIFICATION

A. Products:

1. Nameplates and signs

B. Provide identification on the front of all power distribution equipment such as panelboards, switchboards, switchgear, motor control centers, generators, UPS, storage battery disconnects, transfer switches, etc. Labels shall be visible on the exterior of the gear, correspond to the one-line diagram nomenclature, and identify each cubicle of multi-section gear.

1. Interior Equipment: The identification material shall be engraved plastic-laminated labels.
2. Exterior Equipment: The identification material shall be engraved vinyl labels.
3. Labeling shall include:
 - a. Equipment type and contract documents designation of equipment.
 - b. Voltage of the equipment.
 - c. Name of the upstream equipment and location of the upstream equipment if it is not located within sight.
 - d. Rating and type of the overcurrent protection device serving the equipment if it is not located within sight ("FED BY 400A/3P BREAKER").

DISTRIBUTION PANEL DP-H1
480Y/277V
FED FROM SWITCHBOARD "SB-1" (LOCATED IN MAIN ELEC ROOM)

4. Provide the following on a separate label, installed below the label above:
- a. Available fault current; refer to one-line diagram or panel schedules
 - b. Date of fault current study; refer to one-line diagram

22,000 AMPS AVAILABLE FAULT CURRENT
DATE OF STUDY: 1 JAN 2017

C. Service Equipment Label: A separate nameplate for the service entrance equipment and include:

1. Nominal system voltage
2. Maximum available fault current; refer to one-line diagram for values

3. Clearing time of overcurrent protection devices based on available fault current. Refer to calculations and report from Section 26 05 73 for value.
4. Date of fault current study; refer to one-line diagram
5. Date of label

<p style="text-align: center;">480Y/277V 39,800 AMPS AVAILABLE FAULT CURRENT 0.07 SECOND CLEARING TIME DATE OF STUDY: 1 JAN 2017 DATE OF LABEL: 4 JUL 2017</p>
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D. Arc Energy Reduction Label:

1. Provide a separate engraved plastic laminate label centered at the top of each vertical section of the electrical gear indicating the following when applicable.
 - a. Label: "This equipment is designed with a system listed below".
 - b. Applicable Systems:
 - 1) Zone-selective interlocking system for selective coordination and arc energy reduction
 - 2) Differential relaying system for selective coordination and arc energy reduction
 - 3) Arc energy reducing maintenance switch
 - 4) Energy reducing active arc flash mitigation system

E. Nominal System Voltage Label:

1. Where more than one nominal voltage system exists in a building or facility, the identification of color coding used in the panelboard or equipment shall be permanently posted on the interior of the door or cover.

F. Distribution panelboards and switchboards shall have each overcurrent protection device identified with name and location of the load being served ("AHU-1 LOCATED IN PENTHOUSE 1").

G. Branch panelboards shall be provided with typed panel schedules upon completion of the project. Existing panelboards shall have their existing panel schedules typed, with all circuit changes, additions or deletions also typed on the panel schedules. A copy of all panel schedules for the project shall be turned over as part of the O&M Manuals. Refer to Section 26 05 00 for other requirements.

3.10 ELECTRICAL WORKING CLEARANCE IDENTIFICATION

A. Products:

1. Safety Yellow paint and custom stencils

B. Provide custom identification of electrical equipment working clearances in mechanical, electrical, storage, janitorial, and similar non-public areas.

- C. Identification shall include a painted rectangular box (on the finished floor) in front of the electrical equipment to define the code-required working clearance. Provide additional diagonal stripping inside the rectangle box. All painted stripping shall be safety yellow paint with 3 inch (76mm) wide stripes.
 - 1. Width of area: Width of equipment or as required by code
 - 2. Depth of area: Depth as required by code

3.11 SERIES RATING IDENTIFICATION

- A. Products:
 - 1. Nameplates and signs
- B. Upstream devices of series rated components not enclosed in a single NEMA type enclosure shall be identified with a nameplate reading "CAUTION - SERIES RATED SYSTEM - IDENTICAL COMPONENT REPLACEMENT REQUIRED".
- C. Downstream devices of series rated components not enclosed in a single NEMA type enclosure shall be identified with a nameplate reading "CAUTION - SERIES RATED SYSTEM - ADDITIONAL SERIES COMBINATION RATING: XX,XXX RMS SYMMETRICAL AMPERES" where XX,XXX shall be the series combination rating.

3.12 POLE IDENTIFICATION

- A. Product:
 - 1. Adhesive labels and field markings
 - 2. Nameplates and signs
- B. Lighting poles, bollards and overhead distribution poles shall be individually identified with a unique number, for maintenance purposes. Apply the vinyl label number above the hand hole cover or 24" (610mm) above grade. Bollards may be identified with a number applied inside the luminaire that is visible from the exterior.

END OF SECTION

SECTION 26 27 16

CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Hinged cover enclosures
- B. Cabinets
- C. Terminal blocks and accessories
- D. Custom utility pedestals

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
- B. ANSI/NEMA ICS 1 - Industrial Control and Systems
- C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems
- D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 26 05 00.
- B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.
- C. Include cabinets and enclosures in composite electronic coordination files. Refer to Section 26 05 00 for coordination drawing requirements.
- D. Custom Utility Pedestal:
 - 1. Provide dimensioned diagram of cabinet including front, side, and floor plan views. Show layout of power and control components in elevation views.
 - 2. Provide schematic diagram of power, control functions, panelboards, and other components.
 - 3. Submit installation instructions.

PART 2 - PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; Type 1/3R/4, 14 gauge steel as indicated on drawings.
- B. Finish: Manufacturer's standard polyester powder paint finish.
- C. Covers: Continuous hinge with stainless steel hinge pin. Covers longer than 24 inches shall have 3-point latching.
- D. Locks: Flush 1/4 turn cylinder key latch 3-point latch kit with padlock handle quick-release latch.

- E. Provide interior white painted metal panel for mounting terminal blocks and electrical components.

2.2 CABINETS

- A. Cabinet Fronts: Steel, flush or surface type with concealed hinge and flush lock keyed to match branch circuit panelboard; finish in gray baked enamel.

2.3 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.
- B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.
- C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.4 FABRICATION

- A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.
- B. Provide conduit hubs on enclosures.
- C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.
- B. Provide accessory feet for free-standing equipment enclosures.
- C. Install trim plumb.
- D. Custom Utility Pedestal:
 - 1. Concrete Pad: Provide flush with grade-mounted concrete pad with rebar reinforcement. Pad size: Cabinet size plus 12 inches to allow for mow/landscape apron, 8 inch deep.
 - 2. Provide stainless steel anchor bolts and install per manufacturer's instructions.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Device plates and box covers
- B. Receptacles
- C. Floor boxes

1.2 QUALITY ASSURANCE

- A. Provide similar devices from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the CEC Article 100, by a testing agency to Authorities Having Jurisdiction and marked for intended use.
- C. Comply with the CEC.

1.3 REFERENCES

- A. DSCC W-C-896F – General Specification for Electrical Power Connector
- B. FS W-C-596 - Electrical Power Connector, Plug, Receptacle, and Cable Outlet
- C. NEMA WD 1 – General Color Requirements for Wiring Devices
- D. NEMA WD 6 – Wiring Devices – Dimensional Requirements
- E. California Electrical Code (CEC)
- F. UL 498 – Standard for Attachment Plugs and Receptacles
- G. UL 943 – Standard for Ground Fault Circuit Interrupters

1.4 SUBMITTALS

- A. Submit product data.
- B. Provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.
- C. Submit manufacturer occupancy sensor coverage patterns applicable to this project. For areas requiring multiple sensor devices for appropriate coverage, submit specific manufacturer approved sensor layout as an overlay directly on the project drawings, either in print or approved electronic form.

1.5 COORDINATION

- A. Receptacles for Owner Furnished Equipment: Match plug configurations.
- B. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 DEVICE COLOR

- A. All switch, receptacle, outlet, and coverplate colors shall be white, unless indicated otherwise.

2.2 COVERPLATES

- A. All switches, receptacles, and outlets shall be complete with the following:
 - 1. #302 stainless steel coverplates in finished spaces where walls are finished.
 - 2. #302 stainless steel coverplates in unfinished spaces for flush boxes.
 - 3. Galvanized steel coverplates in unfinished spaces for surface mounted boxes.
- B. Where several devices are ganged together, the coverplate shall be of the ganged style for the number of devices used.
- C. Install nameplate identification as indicated in Section 26 05 53.
- D. Plate securing screws shall be metal with head color matching the wall plate finish.

2.3 RECEPTACLES

- A. Refer to Electrical Symbols List for device type.
- B. Devices that are shaded on the drawings shall be red.
- C. NEMA 5-20R Duplex Receptacle:
 - 1. Approved Manufacturers: Hubbell 5352A, Leviton, 5362-S, Pass & Seymour 5362, Cooper 5352.
 - 2. 125-volt, 20 amp, 3-wire grounding type with impact resistant thermoplastic face and brass back strap.
 - 3. Approved Manufacturers: Hubbell 5352, Leviton 5362-S, Pass & Seymour 5362, Cooper 5362.
 - 4.
- D. NEMA 5-20R Ground Fault Duplex Receptacle:
 - 1. 125-volt, 20 amp, 3-wire grounding type with test and reset buttons in impact resistant thermoplastic face.
 - 2. Device shall perform self-test of GFCI circuitry in accordance with UL 943.
 - 3. Approved Manufacturers: Hubbell GF20L, Leviton GFNT2, Pass & Seymour 2097, Cooper SGF20.

- E. NEMA 5-20R Weatherproof Ground Fault Duplex Receptacle:
1. 125-volt, 20 amp, 3-wire grounding type with test and reset buttons in impact resistant thermoplastic face. Provide NEMA 3R rated while-in-use cast aluminum cover.
 2. Device shall perform self-test of GFCI circuitry in accordance with UL 943.
 3. Approved Manufacturers: Hubbell GFTR20/(RW57300) WP826, Leviton GFWT2/(5977-CL) M5979, Pass & Seymour 2097TRWR/(WIUC10-C) WIUCAST1, Cooper WRSGF20/(WIU-1) WIUMV-1.
- F. NEMA 5-20R Simplex Receptacle:
1. 125-volt, 20 amp, 3-wire grounding type with impact resistant thermoplastic face.
 2. Approved Manufacturers: Hubbell HBL5361, Leviton, 5361, Pass & Seymour 5361, Cooper 5361.
- G. NEMA 5-30R Simplex Receptacle:
1. 125-volt, 30 amp, 3-wire grounding type, phenolic face.
 2. Approved Manufacturers: Hubbell HBL9308, Leviton 5371, Pass & Seymour 3802, Cooper 5716N.
- H. NEMA 5-50R Simplex Receptacle:
1. 125-volt, 50 amp, 3-wire grounding type, phenolic face.
 2. Approved Manufacturers: Hubbell HBL9360, Cooper 1253.
- I. NEMA 6-20R Simplex Receptacle:
1. 250-volt, 20 amp, 2-pole, 3-wire grounding type with thermoplastic face.
 2. Approved Manufacturers: Hubbell HBL5461, Leviton 5461, Pass & Seymour 5871, Cooper 5461.
- J. NEMA 5-20R Weatherproof Ground Fault Quad Receptacle:
1. Consists of two duplex, GFI receptacles. Double gang box. Provide NEMA 3R rated while-in-use cast aluminum cover.
 2. Approved Manufacturers:
 - a. Receptacle: Refer to GFCI Receptacle above.
 - b. Cover: Intermatic WP1030MXD, Pass & Seymour WIUCAST2, Thomas & Betts Red Dot 2CKU.
- K. Back wired devices shall be complete with eight holes that are screw activated with metal clamps for connection to #12 or #10 copper conductors.
- L. Side wired devices shall have four binding screws that are undercut for positive wire retention.

- M. Ground fault circuit interrupter (GFCI) receptacles shall comply with UL 943 requiring increased surge immunity, improved corrosion resistance, improved resistance to false tripping and diagnostic indication for miswiring if the line and load conductors are reversed during installation.

2.4 FLOOR BOXES

- A. Color: Verify with Architect.
- B. Coordinate with Technology drawings for voice/data outlet requirements.
- C. Floor Boxes for Installation in Cast-In-Place Concrete Floors: Fully adjustable, cast iron.
- D. Flush-mounted, round, cast iron floor box with one (1). Fully adjustable, round brass cover with duplex flap cover and brass carpet flange.
 - 1. Approved Manufacturers:
 - a. Hubbell B2537 (Box), S3925 (Cover), S3082 (Flange), HBL5362 (Recept)
 - b. Wiremold 880 CS1
 - c. Steel City 602-SC / P60-DS
- E. Fully adjustable cast iron floor box, dual compartment, flush mount, brass carpet flange. One compartment with brass 2-1/8" x 3/4" combination cover for power connections to partitions by others, connection wire by EC. One compartment with brass 1-1/2" x 1-1/2" duplex thread cover with one (1) 3/4" and one (1) 1" conduit stubbed to above the lay-in ceiling routed to the corridor cable tray.
 - 1. Approved Manufacturers:
 - a. Hubbell B4233 (Box), S2425 (Cover), S3625 (Cover), SB3085 (Flange)
 - b. Wiremold 880CS2
 - c. Steel City 642
- F. Cast iron floor box, dual compartment, flush mount, brass carpet flange. One compartment with one (1) and brass duplex flap cover. One compartment with brass 2-1/8" x 3/4" combination cover and one (1) 3/4" and one (1) 1" conduit stubbed to above the lay-in ceiling routed to the corridor cable tray.
 - 1. Approved Manufacturers:
 - a. Hubbell B4233 (Box), S2425 (Cover), S3825 (Cover), SB3084 (Flange), 5362 (Recept)
 - b. Wiremold 880CS2
 - c. Steel City 642
- G. Recessed multi-service floor box - tele/power/data. Equivalent mounting space of four (4) single gang boxes consisting of one (1), one (1) voice outlet, one (1) data outlet, and one (1) spare. Cast iron adjustable rectangular floor box with cover. Provide one (1) 1" conduit for information outlet cabling, one (1) 1" conduit for audio/visual cabling, and one (1) 1" conduit as spare. Route low voltage cabling conduits to above the lay-in ceiling the corridor cable tray.

1. Approved Manufacturers:
 - a. Wiremold RFB4-CI
 - b. Steel City 665-CI
 - c. Hubbell LCFBCA
- H. Three service floor box - tele/power/data. Equivalent mounting space of four (4) single gang boxes consisting of one (1), one (1) voice outlet, one (1) data outlet, and one (1) spare. Steel adjustable rectangular floor box with flush cover. Provide one (1) 1" conduit for information outlet cabling, one (1) 1" conduit for audio/visual cabling, and one (1) 1" conduit as spare. Route low voltage cabling conduits to above the lay-in ceiling the corridor cable tray.
 1. Approved Manufacturers:
 - a. Wiremold RFB4
 - b. Steel City 665
 - c. Hubbell HBLCFB301BASE

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install light switches, dimmers, and convenience receptacles at elevations indicated in the General Installation Notes on the contract drawings.
- B. Install specific-use receptacles at heights shown on the contract drawings. Install devices level, plumb, and square with building lines. Coordinate installation of adjacent devices of separate systems with common mounting heights, including lighting, power, systems, technology, and temperature control device rough-ins.
- C. Drill opening for poke-through fitting installation in accordance with manufacturer's instructions. This Contractor is responsible for taking any measures required to ensure no conduits or other services are damaged. This may include X-ray or similar non-destructive means.
- D. Install receptacles vertically with ground slot up or where indicated on the drawings, horizontally with ground slot to the left.
- E. Install decorative plates on switch, receptacle, and blank outlets in finished areas, using jumbo size plates for outlets installed in masonry walls.
- F. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- G. Install devices and wall plates flush and level.
- H. Contractor to verify that wall dimmer ratings are achieved where a ganged installation is used.
- I. Install nameplate identification to receptacle cover plates indicated. Identification shall identify panel name and circuit number. Refer to Specification Section 26 05 53 - Electrical Identification.
- J. Identify locations of power packs, control units, and relays above ceiling on record drawing.

- K. Test receptacles for proper polarity, ground continuity and compliance with requirements.
- L. Healthcare devices shall be tested in accordance with NFPA 99 6.3.3 for grounding, voltage, and impedance measurements.
- M. Floor Box Installation:
 - 1. Set boxes level and flush with finish flooring material.
 - 2. Use cast iron floor boxes for installations in slab on grade. Trim shall match floor covering to be used.
 - 3. Provide a minimum horizontal offset of 24 inches between boxes.
 - 4. Provide saw-cutting and patching of existing concrete floors as necessary for floor box installations within existing floors.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fuses
- B. Spare Fuse Cabinet

1.2 REFERENCES

- A. UL 198C - High-Interrupting Capacity Fuses; Current Limiting Types
- B. UL 198E - Class R Fuses
- C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses)
- D. NEMA FU 1 - Low Voltage Cartridge Fuses
- E. California Electrical Code (CEC)

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 26 05 00.

1.4 EXTRA MATERIALS

- A. Provide two fuse pullers.
- B. Provide three of each size and type of fuse installed.

1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40°F or more than 100°F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS – FUSES

- A. Cooper Bussman
- B. Eagle Electric Mfg. Co.; Cooper Industries
- C. Mersen
- D. Tracor; Littelfuse Subsidiary

2.2 FUSES

- A. Dimensions and Performance: NEMA FU 1, Class as specified or indicated.
- B. Voltage: Provide fuses with voltage rating suitable for circuit phase-to-phase voltage.
- C. Fuses with ratings larger than 600 amperes: Class L (time delay), unless otherwise noted on the drawings.
- D. Fuses with ratings larger than 200 amperes but equal to or less than 600 amperes: Class RK-1 (time delay), unless otherwise noted on the drawings.

- E. Fuses with ratings less than or equal to 200 amperes (not including control transformer fuses): Class RK-5, unless otherwise noted on the drawings.
- F. Control transformer fuses: Class CC (time delay).
- G. Fuses for packaged equipment: Size and type as recommended by equipment manufacturer.

2.3 SPARE FUSE CABINET

- A. Cabinet: Wall-mounted, 0.05-inch- thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch- high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fuses where indicated on the drawings and specifications.
- B. Install fuses in accordance with manufacturer's instruction.
- C. Install fuses in packaged equipment as required by equipment manufacturer.
- D. Install fuse with label oriented such that manufacturer, type, and size are easily read.
- E. Install spare fuse cabinet.

END OF SECTION

SECTION 26 28 16

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fusible switches
- B. Molded case circuit switches
- C. Molded case switches
- D. Enclosures

1.2 RELATED SECTIONS AND WORK

- A. Refer to the Disconnect and Starter Schedule for rating and configuration.

1.3 REFERENCES

- A. NEMA KS 1 - Enclosed Switches

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 26 05 00.
- B. Product Data: For each type of enclosed switch, circuit breaker, accessory and component indicated, include dimensions, weights, and manufacturer's technical data on features, performance, and ratings.
- C. Electrical Characteristics: For each type of enclosed switch, enclosure types, current and voltage ratings, short-circuit current ratings, UL listing for series rating of installed devices, features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

1.5 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE AND NON-FUSIBLE SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1; Type heavy duty, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: Class 'R' fuse clips only, unless indicated otherwise on the drawings.
- B. Non-fusible Switch Assemblies: NEMA KS 1; Type heavy duty, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

- C. Enclosures: Type as indicated on the disconnect schedule.
- D. Accessories: As indicated on the disconnect schedule.

2.2 MOLDED CASE CIRCUIT BREAKERS AND SWITCHES

- A. Molded Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
 - 1. Thermal Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip settings.
 - 3. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time adjustments.
 - d. Ground-fault pickup level, time delay, and I²t responses.
 - 4. Current Limiting Circuit Breakers: Frame sizes 400 A and smaller and let-through ratings less than NEMA FU 1, RK-5.
- B. Molded Case Switches: Molded case circuit breaker with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.
- C. Accessories: As indicated on the disconnect schedule.

2.3 MOTOR DISCONNECT SWITCH

- A. Rotary Switch Assemblies: Rated for making and breaking loads, rotary type enclosed switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- B. Enclosures: Type as indicated on the Disconnect Schedule.
- C. Ground lug connection provided in enclosure.
- D. Accessories: As indicated on the Disconnect Schedule.
- E. Listed UL 508 suitable for motor control.

2.4 MECHANICALLY INTERLOCKED DISCONNECT

- A. Switch and Plug Assemblies: Rated for making and breaking loads, enclosed switch with externally operable interlock to prevent disconnecting receptacle with switch in ON position or inserting receptacle in ON position. Padlock lockable provision to meet OSHA lockout/tagout regulations.
- B. Enclosures: Type as indicated on the Disconnect Schedule.

- C. Ground lug connection provided in enclosure.
- D. Listed UL 2682 suitable for motor disconnect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated on the drawings.
- B. Install fuses in fusible disconnect switches.
- C. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.

3.2 ADJUSTING

- A. Set field-adjustable circuit breaker trip ranges.

END OF SECTION

SECTION 27 05 26

GROUNDING AND BONDING FOR TELECOMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Requirements:
 - 1. Section 27 13 00 "Communications Backbone Cabling".
 - 2. Section 27 15 00 "Communications Horizontal Cabling".

1.2 SUMMARY

- A. Section Includes:
 - 1. Grounding conductors.
 - 2. Grounding connectors.
 - 3. Grounding busbars.
 - 4. Grounding labeling.

1.3 SCOPE OF WORK

- A. 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.

1.4 RELATED WORK

- A. Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.

1.5 QUALIFICATIONS

- A. The Installing Electronic Systems Contractor shall hold a valid State of California C-7 license for all low voltage installations and a State of California C-10 License for any related high-voltage applications and shall have completed at least twenty projects including five projects with Cajon Valley Union School District of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least ten years, and capable of being bonded to assure the District of performance and satisfactory service during the guarantee period.
- B. The Installing Electronic Systems Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor shall maintain a spare set of all major parts for the system at all times.

1.6 DEFINITIONS

- A. BCT: Bonding conductor for telecommunications.
- B. BDF: Building Distribution Frame
- C. BICSI: Building Industry Consulting Service International.
- D. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.
- E. EMT: Electrical metallic tubing.
- F. IDF: Intermediate Distribution Frame
- G. MDF: Main Distribution Frame
- H. LAN: Local area network.
- I. RCDD: Registered Communications Distribution Designer.
- J. TGB: Telecommunications grounding busbar.
- K. TMGB: Telecommunications main grounding busbar.

1.7 APPLICABLE STANDARDS

- A. The equipment shall be U.L. listed labeled, and approved for the application shown in the contract documents.
- B. The complete system material, equipment, testing, installation and workmanship shall comply with requirements of:
 - 1. The Contract Documents.
 - 2. ANSI/TIA 568 Commercial Building Telecommunications Standards (Current Editions, including all applicable revisions, addendums and errata's.)
 - 3. ANSI/EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces (Current Edition, including all applicable revisions, addendums and errata's.)
 - 4. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings – All applicable revisions and addendums.
 - 5. J-STD-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications (Current Edition, including all applicable revisions, addendums and errata's.)
 - 6. Building Industries Consulting Services, International (BICSI) Telecommunications Distribution Methods Manual (TDMM) (Current Edition, including all applicable revisions, addendums and errata's.)
 - 7. CEC (Current Edition, including all applicable revisions, addendums and errata's.)

1.8 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For communications equipment room signal reference grid. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include dimensioned plan and elevation views of telecommunications equipment rooms, labeling each individual component. Show equipment rack assemblies, method of field assembly, workspace requirements, and access for cable connections.
 - 2. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by District.
 - 3. Cabling Administration Drawings.

1.9 INFORMATIONAL SUBMITTALS

- A. Submit references for a minimum of twenty similar projects successfully undertaken and completed within the last ten years. As a minimum, provide project name and address, client contact name and telephone number, and construction manager name and telephone number. Provide a brief description of each project indicating types of systems installed, quantities and configurations of outlets, and projected time scales.
- B. As-Built Data: Plans showing as-built locations of grounding and bonding infrastructure, including the following:
 - 1. BCT, TMGB, TGBs, and routing of their bonding conductors.
- C. Qualification Data: For Installer.
- D. Qualification Data: For testing agency and testing agency's field supervisor.
- E. Field quality-control reports.

1.10 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. Include the following with Operation and Maintenance Data.
 - a. Result of the ground-resistance test, measured at the point of BCT connection.
 - b. Result of the bonding-resistance test at each TMGB/TGB and its nearest grounding electrode.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Installation Supervision: Installation shall be under the direct supervision of ITS Installer 2, who shall be present at all times when Work of this Section is performed at Project site.
 - 2. Field Inspector: Currently registered by BICSI as a registered communications distribution designer to perform the on-site inspection.
 - 3. Products, services, and materials provided by the Contractor shall be new and of high quality and free of faults and defects.

4. Provide products, services, and materials as specified in this document. Substitution of products, services, or materials will only be considered if the Contactor follows procedures and requirements specified in Division 1.
5. Contractor shall warranty all work executed and materials furnished shall be free from defects of material and workmanship for a period of two (2) years from acceptance date of Contract Completion. Immediately upon receipt of written notice from the District, Contractor shall repair or replace at no expense to the District: Any defective material or work which may be discovered before final acceptance or work, or within warranty period; any material or work damaged thereby; and adjacent material or work which may be displaced in repair or replacement.
6. Examination of or failure to examine work by the District shall not relieve Contractor from these obligations.
7. If Contractor fails to repair or replace material or work indicated above within 7 days of receiving written notice, the District, with its own personnel or by Contract, may proceed with repair or replacement and assess cost against Contractor, if Contractor does not respond accordingly.
8. Persons skilled in trade shall install system in accordance with best trade practice. Further, in accordance with all applicable building codes. Contractor and all contractors' employees terminating cable to wiring terminating devices shall be certified by the manufacturer of the wiring device. Copies of certificates shall be provided to the District Representative prior to the start of work.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Harger Lightning and Grounding.
 2. Panduit Corp.
 3. Tyco Electronics Corp.
- B. Comply with UL 486A-486B.
- C. Insulated Conductors: Stranded copper wire, green or green with yellow stripe insulation, insulated for 600 V, and complying with UL 83.
 1. Ground wire for custom-length equipment ground jumpers shall be No. 6 AWG, 19-strand, UL-listed, Type THHN wire.
 2. Cable Tray Equipment Grounding Wire:
 - a. No. 6 AWG.
 - b. Not longer than 12 inches (300 mm). The jumper shall be a wire and shall have a crimped grounding lug with two holes and long barrel for two crimps. Attach with grounding screw or connector provided by cable tray manufacturer.
- D. Bare Copper Conductors:
 1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

2.2 CONNECTORS

- A. Irreversible connectors listed for the purpose. Listed by an NRTL as complying with CEC for specific types, sizes, and combinations of conductors and other items connected. Comply with UL 486A-486B.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burndy; Part of Hubbell Electrical Systems.
 - 2. Chatsworth Products, Inc.
 - 3. Harger Lightning and Grounding.
 - 4. Panduit Corp.
 - 5. Tyco Electronics Corp.
- C. Compression Wire Connectors: Crimp-and-compress connectors that bond to the conductor when the connector is compressed around the conductor. Comply with UL 467.
 - 1. Electroplated tinned copper, C and H shaped.
- D. Signal Reference Grid Connectors: Combination of compression wire connectors, access floor grounding clamps, bronze U-bolt grounding clamps, and copper split-bolt connectors, designed for the purpose.
- E. Busbar Connectors: Cast silicon bronze, solderless compression or exothermic-type, mechanical connector; with a long barrel and two holes spaced on 5/8- or 1-inch (15.8- or 25.4-mm) centers for a two-bolt connection to the busbar.
- F. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING BUSBARS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Chatsworth Products, Inc.
 - 2. Harger Lightning and Grounding.
 - 3. Panduit Corp.
- B. TMGB: Predrilled, wall-mounted, rectangular bars of hard-drawn solid copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, length as indicated on Drawings. The busbar shall be NRTL listed for use as TMGB and shall comply with J-STD-607-B.
 - 1. Predrilling shall be with holes for use with lugs specified in this Section.
 - 2. Mounting Hardware: Stand-off brackets that provide a 4-inch (100-mm) clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.
 - 3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.
- C. TGB: Predrilled rectangular bars of hard-drawn solid copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, length as indicated on Drawings. The busbar shall be for wall mounting, shall be NRTL listed as complying with UL 467, and shall comply with J-STD-607-B.

1. Predrilling shall be with holes for use with lugs specified in this Section.
 2. Mounting Hardware: Stand-off brackets that provide at least a 2-inch (50-mm) clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.)
 3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.
- D. Rack and Cabinet Grounding Busbars: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with J-STD-607-B.
1. Predrilling shall be with holes for use with lugs specified in this Section.
 2. Cabinet-Mounted Busbar: Terminal block, with stainless-steel or copper-plated hardware for attachment to the cabinet.
 3. Rack-Mounted Horizontal Busbar: Designed for mounting in 19-inch (483-mm) equipment racks. Include a copper splice bar for transitioning to an adjoining rack, and stainless-steel or copper-plated hardware for attachment to the rack.

2.4 LABELING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Brother International Corporation.
 2. HellermannTyton.
 3. Panduit Corp.
- B. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the ac grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of the electrical system.
- B. Inspect the test results of the ac grounding system measured at the point of BCT connection.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

3.2 INSTALLATION

- A. Comply with NECA 1.

- B. Comply with J-STD-607-B.
- C. All racks, cabinets, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the Telecommunication Room or Equipment Room shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack do not have sufficient metal to metal contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #12 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack-mount equipment. The conductor shall be continuous; attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.
- D. All wires used for telecommunications grounding purposes shall be identified with green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification

3.3 APPLICATION

- A. Conductors: Install solid conductor for No. 8 AWG and smaller and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 - 1. Equipment Grounding Conductor Terminations: Bolted connectors.
- C. Conductor Support:
 - 1. Secure grounding and bonding conductors at intervals of not less than 36 inches (900 mm).
- D. Grounding and Bonding Conductors:
 - 1. Install in the straightest and shortest route between the origination and termination point, and no longer than required. The bend radius shall not be smaller than eight times the diameter of the conductor. No one bend may exceed 90 degrees.
 - 2. Install without splices.
 - 3. Support at not more than 36-inch (900-mm) intervals.
 - 4. Conductors shall not be installed in EMT unless otherwise indicated.

3.4 CONNECTIONS

- A. Bond metallic equipment in a telecommunications equipment room to the grounding busbar in that room, using equipment grounding conductors not smaller than No. 6 AWG.
- B. Stacking of conductors under a single bolt is not permitted when connecting to busbars.
- C. Assemble the wire connector to the conductor, complying with manufacturer's written instructions and as follows:
 - 1. Use crimping tool and the die specific to the connector.
 - 2. Pretwist the conductor.
 - 3. Apply an antioxidant compound to all bolted and compression connections.

- D. Primary Protector: Bond to the TMGB with insulated bonding conductor.
- E. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install top-mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 6 AWG bonding conductors.
- F. Shielded Cable: Bond the shield of shielded cable to the TGB in communications rooms and spaces. Comply with TIA/EIA-568-B.1 and TIA/EIA-568-B.2 when grounding screened, balanced, twisted-pair cables.
- G. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with CEC; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to bonding requirements in this Section.

3.5 IDENTIFICATION

- A. Labels shall be preprinted or computer-printed type.
 - 1. Label each telecommunications conductor at its attachment point: "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

3.6 FIRESTOP SYSTEMS

- A. A firestop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
- B. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
- C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479). Refer to Drawings for details and UL#.
- D. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 - 1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

2. Test the bonding connections of the system using an AC earth ground-resistance tester, taking two-point bonding measurements in each telecommunications equipment room containing a TMGB and a TGB and using the process recommended by BICSI TDMM. Conduct tests with the facility in operation.
 - a. Measure the resistance between the busbar and the nearest available grounding electrode. The maximum acceptable value of this bonding resistance is 100 milliohms.
3. Test for ground loop currents using a digital clamp-on ammeter, with a full-scale of not more than 10 A, displaying current in increments of 0.01 A at an accuracy of plus/minus 2.0 percent.
 - a. With the grounding infrastructure completed and the communications system electronics operating, measure the current in every conductor connected to the TMGB. Maximum acceptable ac current level is 1 A.
- D. Excessive Ground Resistance: If resistance to ground at the BCT exceeds 5 ohms, notify Architect promptly and include recommendations to reduce ground resistance.
- E. Grounding system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

3.8 CLEANING AND PROTECTION

- A. 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.

3.9 WARRANTY

- A. 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 District.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the District after the end of the guarantee period.
- C. 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.

D. Special Warranty

1. The contractor shall warrant the cabling system against defects in workmanship for a period of one year from the date of system acceptance. The warranty shall cover all labor and materials necessary to correct a failed portion of the system and to demonstrate performance within the original installation specifications after repairs are accomplished. All warranty repairs shall be done within fourteen days from being notified in writing by the District. This warranty shall be provided at no additional cost to the District.

END SECTION

SECTION 27 11 00

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:

1. Telecommunications mounting elements.
2. Backboards.
3. Telecommunications equipment racks and cabinets.
4. Grounding.

1.03 SCOPE OF WORK

- A. 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.
- B. All terminal cabinets, backboards, equipment, devices, etc. unless existing, shall be furnished and installed complete under this section. The entire responsibility of the system, including the installation, operation, function, testing and maintenance for one (1) year after final acceptance under this section shall be the responsibility of the installing electronic contractor.

The Installing Electronic Systems 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.

1.04 DEFINITIONS

- A. BDF: Building Distribution Frame
- B. BICSI: Building Industry Consulting Service International.
- C. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.
- D. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

- E. EMI: Electromagnetic interference.
- F. IDC: Insulation displacement connector.
- G. IDF: Intermediate Distribution Frame
- H. MDF: Main Distribution Frame
- I. LAN: Local area network.
- J. RCDD: Registered Communications Distribution Designer.

1.05 APPLICABLE STANDARDS

- A. The equipment shall be U.L. listed labeled, and approved for the application shown in the contract documents.
- B. The complete system material, equipment, testing, installation and workmanship shall comply with requirements of:
 - 1. The Contract Documents.
 - 2. ANSI/TIA 568 Commercial Building Telecommunications Standards (Current Editions, including all applicable revisions, addendums and errata's.)
 - 3. EIA/TIA-TSB-36 Technical Systems Bulletin, Additional Cable Specifications for Unshielded Twisted-Pair Cables (Current Edition, including all applicable revisions, addendums and errata's.)
 - 4. TIA/EIA-TSB-40 Telecommunications Systems Bulletin, Additional Transmission Specifications for Unshielded-Pair Connecting Hardware (Current Edition, including all applicable revisions, addendums and errata's.)
 - 5. TIA/EIA-TSB-75 Telecommunications System Bulletin, Additional Transmission Specifications for Unshielded Twisted-Pair consolidation points and cabling (Current Edition, including all applicable revisions, addendums and errata's.)
 - 6. ANSI/EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces (Current Edition, including all applicable revisions, addendums and errata's.)
 - 7. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings – All applicable revisions and addendums.
 - 8. J-STD-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications (Current Edition, including all applicable revisions, addendums and errata's.)
 - 9. Building Industries Consulting Services, International (BICSI) Telecommunications Distribution Methods Manual (TDMM) (Current Edition, including all applicable revisions, addendums and errata's.)

10. TIA TSB62-23 Telecommunications Systems Bulletin, Measurement of the Non-linear coefficient of single-mode fibers (Current Edition, including all applicable revisions, addendums and errata's.)
11. CEC (Current Edition, including all applicable revisions, addendums and errata's.)

1.06 QUALIFICATIONS

- A. The installing Electronic Contractor must be a certified contractor. Provide a copy of Contractor's I certification with bid package.
- B. The Installing Electronic Systems Contractor shall hold a valid State of California C-7/C-10 license for all low voltage installations and a State of California C-10 License for any related high-voltage applications and shall have completed at least twenty projects including five projects with Grossmont Union High School District of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least ten years, and capable of being bonded to assure the District of performance and satisfactory service during the guarantee period.
- C. The Installing Electronic Systems Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The 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.

1.07 ACTION SUBMITTALS

- A. Shop Drawings:
 1. Include dimensioned plan and elevation views of telecommunications equipment rooms, labeling each individual component. Show equipment rack assemblies, method of field assembly, workspace requirements, and access for cable connections.
 2. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by District.
 3. Cabling Administration Drawings.
- B. Wiring diagrams to show typical wiring schematics including the following:
 1. Patch cords (Category 6 and Fiber Optic). Copper patch panels and blocks.
 2. Fiber-optic enclosures.
 3. Distribution blocks.
 4. Equipment racks.
- C. Submit manufacturers' product data sheets for each component of the data system. Certify that the data sheets depict the components to be provided by the Contractor to make up the complete system as described in this specification. Submit details of

the warranty (including manufacturer warranties) to be provided for the cabling systems, clearly indicating that all components are covered.

- D. Submit samples of the labels to be used for labeling cables, patch panels, termination frames, cabinets and racks.
- E. Once samples have been submitted, reviewed by the School District Representative and approved they shall be retained. The samples shall be used as the standards by which the quality of work on the project by the Contractor shall be judged. Any installation, which does not meet this Once samples have been submitted, review by the School District Representative and approved, they standard, shall be replaced or reworked as approved by the School District Representative.

1.08 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
 - 1. Submit references for a minimum of twenty similar projects successfully undertaken and completed within the last ten years. As a minimum, provide project name and address, client contact name and telephone number, and construction manager name and telephone number. Provide a brief description of each project indicating types of systems installed, quantities and configurations of outlets, and projected time scales.
- B. Seismic Qualification Certificates: For equipment frames from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions. Base certification on the maximum number of components capable of being mounted in each rack type. Identify components on which certification is based.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.09 AS BUILT DOCUMENTATION

- A. Patch panel and fiber enclosure identification shall be coordinated with School District Representative.
- B. The prints shall also contain the cabling routes taken between the cable tray, conduit and/or J-Hooks and the termination areas.
- C. An additional requirement shall be a wire run list created in Microsoft Excel that contains the specific details of each location and all of the cables that are terminated there. Create separate tabs in the spreadsheet for MDF and each IDF.

1.10 COORDINATION

- A. Coordinate layout and installation of telecommunications equipment with District's Representative.

- B. Meet jointly with telecommunications and LAN equipment suppliers and District to exchange information and agree on details of equipment arrangements and installation interfaces.
- C. Record agreements reached in meetings and distribute to other participants.
- D. Adjust arrangements and locations of distribution frames and cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

1.11 SYSTEM TESTING

- A. Following voice, data, IP speaker-clock and fiber optic cable installation and termination at both ends, undertake and record tests to ensure that the cabling system will perform satisfactorily in service. In addition to the tests detailed in this specification, the Contractor shall carry out any additional tests that he deems necessary to ensure the satisfactory operation of the telephone, data, and fiber optic cable systems. The costs of these additional tests shall be borne by the Contractor.
- B. Provide the District Representative with the opportunity to witness all testing. On request, the installer shall demonstrate that the test procedure competently identifies the fault conditions being tested for.
- C. Complete the tests identified in all of the voice, data and IP speaker-clock system specifications.
- D. Notify the District Representative fourteen working days before the date of commencement of the cable tests. Provide details, on that advance date, of proposed tests, the test schedule, equipment to be used, its certification and calibration, and the names and qualifications of test personnel.
- E. Personnel shall be competent in and qualified by experience or training for detailed design, installation, and testing of voice, data, and fiber optic cable systems.
- F. Include the cost of obtaining, calibrating, and maintaining test equipment, and the cost of carrying out and recording the tests, including labor costs, in the bid sum.
- G. Ensure that all Test Equipment is in calibration before delivery to site and throughout the testing period. The installer shall be responsible for ensuring that any necessary tests and rework to maintain equipment's calibration status are carried out.
- H. To support the test procedure, create a printed table of every cable in the building with appropriate columns for each test result and comments.
- I. Sign and date each successful series of test results as the tests proceed. As a minimum, each completed page of test results shall be signed and dated once all the tests on that page have been successfully completed and their results recorded.
- J. The test documentation shall be available for inspection by the School District Representative during the installation period and the original documents (not copies or retyped versions) shall be passed to the School District Representative within five working days of completion of tests on cables in each area. The installer shall retain a copy to aid preparation of as-built information.

- K. Failures detected during the testing shall be duly noted on the test results schedule and rectified. On the fault being rectified, this shall also be noted. These notes shall not be deleted or obliterated.
- L. Rectification of all damaged cables shall include replacing damaged cables with new cables in complete runs or remaking poor terminations. In-line cable joints, splices, or distribution points are not acceptable. All damaged cables shall be removed from site.

1.12 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of RCDD.
 - 2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Field Inspector: Currently registered by BICSI as RCDD to perform the on-site inspection.
 - 4. Products, services, and materials provided by the Contractor shall be new and of high quality and free of faults and defects.
 - 5. Provide products, services, and materials as specified in this document. Substitution of products, services, or materials will only be considered if the Contactor follows procedures and requirements specified in Section 01.
 - 6. Contractor shall warranty all work executed and materials furnished shall be free from defects of material and workmanship for a period of two (2) years from acceptance date of Contract Completion. Immediately upon receipt of written notice from the District, Contractor shall repair or replace at no expense to the District: Any defective material or work which may be discovered before final acceptance or work, or within warranty period; any material or work damaged thereby; and adjacent material or work which may be displaced in repair or replacement.
 - 7. Examination of or failure to examine work by the District shall not relieve Contractor from these obligations.
 - 8. If Contractor fails to repair or replace material or work indicated above within 7 days of receiving written notice, the District, with its own personnel or by Contract, may proceed with repair or replacement and assess cost against Contractor, if Contractor does not respond accordingly.
 - 9. Persons skilled in trade shall install system in accordance with best trade practice. Further, in accordance with all applicable building codes. Contractor and all contractors' employees terminating cable to wiring terminating devices shall be certified by the manufacturer of the wiring device. Copies of certificates shall be provided to the District Representative prior to the start of work.

PART 2 – PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Retain "Seismic Performance" Paragraph below with "Seismic Qualification Certificates" Paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete paragraph if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.
- B. Seismic Performance: Equipment frames shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified [and the unit will be fully operational after the seismic event]."

2.02 SUBSTITUTIONS: Not accepted.

2.03 EQUIPMENT CABINET

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Hubbell Incorporated (Hubbell Premise Wiring)
- B. Equipment Frame
 - 1. Manufacturer Chatsworth Products, Inc.
 - a. Floor mounted movable IDF cabinet per District Standard.
 - 2. Double-Sided Tray (UPS and/or CPU), provide (2) per MDF:
 - a. Manufacturer: Chatsworth Products, Inc.
 - b. Description: 18-3/4" deep x 5-3/4" high x 19" wide.
 - 3. Single-Sided Tray (F.O.T.), provide (1) per MDF:
 - a. Manufacturer: Chatsworth Products, Inc.
 - b. Description: 15" deep x 5-3/16" high x 19" wide.
 - 4. Wire Managers
 - a. Manufacturer: Chatsworth Products, Inc. / TE Connectivity (AMP), or equal.
 - b. Description: **3-1/2" high** x 19" wide x 2" deep.
 - c. Provide **1U** horizontal wire management between each patch panel and piece of rack mounted equipment. Provide (2) spares
 - 5. Provide vertical wire management at both ends of each rack front and back sides.
 - a. CPI# 30161-703
 - 6. Rack Mount Vertical Power Outlet Strip
 - a. CPI Part #12848-706 with 20 amp power cord, or equal.
 - b. Description: Rack mounting power strip with 6 receptacles on back, front panel with master switch, indicator light, and circuit breaker. Power strip shall be vertically mounted.
 - c. 6' power cord.

- C. IDF Grounding, provide grounding kit in IDF rack for grounding:
 - 1. Manufacturer: Chatsworth Products, Inc.
 - a. CPI# 41016-001 (Invalid part #.)
- 2.04 IDF EQUIPMENT
- A. Fiber Enclosure
 - 1. Provide 1U fiber enclosure.
 - a. TE Connectivity# 1-1657014-7
 - 2. Duplex SC fiber snap-in adapter panels in quantities required.
 - a. TE Connectivity# 559596-5
 - 3. Provide SC MM fiber connectors, MM fiber couplers, fan-out kits and fiber patch cords as necessary to terminate all fibers in the MDF.
 - B. Copper Patch Panels
 - 1. Provide High Density ACO Category 6 24-port patch panels in quantities as required to terminate Category 6a cables from each outlet. Leave 25% spare capacity for future cable terminations. Provide cable support bars at rear of each panel. All cables shall be secured to bar using Velcro straps.
 - a. TE Connectivity# 1479834-1
 - 2. Provide ACO Category 6 inserts (patch panel shall be fully loaded.)
 - a. TE Connectivity# 1644027-3
 - 1) EIA 568B Wired.
 - 2) Black in color.
 - 3. Provide 24-ports voice patch panels with 25 pair tails for incoming Voice feed termination block in IDF rack to terminate voice cables, Ortronics #OR-808004388.
 - C. Uninterruptable Power Supply, provide (1) per MDF:
 - 4. Manufacturer: American Power Conversions (APC)
 - a. APC# SRT2200RMXLA (Part # SURTA2200RMXL2U discontinued; this is the recommended replacement.)
 - 1) **Provide PowerChute software.**
 - 2) Provide (1) APC# AP9630 Network Management Card 2.
 - D. Horizontal Power Strip, provide (2):
 - 1. Power Strips: Comply with UL 1363.
 - 2. Listed and labeled as defines in CEC, by a qualified testing agency, and marked for intended location and application.
 - 3. Rack mounting.
 - 4. Nine, 15-A, 120-V ac, NEMA WD 6, Configuration 5-15R and one always on receptacles. APC# NET9RMBLK.
 - 5. LED indicator lights for power and protection status.
 - 6. LED indicator lights for reverse polarity and open outlet ground.
 - 7. Circuit Breaker and Thermal Fusing: When protection is lost, circuit opens and cannot be reset.
 - 8. Cord connected with 15-foot (4.5-m) line cord.
 - 9. Rocker-type on-off switch, illuminated when in on position.

10. Peak Single-Impulse Surge Current Rating: 26 kA per phase.
11. Protection modes shall be line to neutral, line to ground, and neutral to ground. UL 1449 clamping voltage for all three modes shall be not more than 330 V.

E. Patch Cords

1. Fiber, provide quantities as required to connect to active hardware. Coordinate with District.
 - a. Duplex SC to Duplex LC MM 50/125 micron XG
 - 1) TE Connectivity# 1907380-2 (2-meter in length)
2. Copper, provide quantities as required for total count of data drops. Color shall be gray. Patch cords to be installed by District.
 - a. 7' patch cords, 25% of total drop count.
 - 1) TE Connectivity# 219885-7.
 - b. 4' patch cords, 75% of total drop count.
 - 1) TE Connectivity# 219885-4.

F. Multi-pair copper terminations:

1. Provide wall-mounted 66-blocks for multi-pair copper cable termination.
2. Fuse protectors not required.

2.05 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Telecommunications Systems" for grounding conductors and connectors.
- B. Comply with J-STD-607.

2.06 LABELING

- C. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.01 ENTRANCE FACILITIES

- A. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and housing when so directed by service provider.
- B. Comply with requirements in Section 270528 "Pathways for Communications Systems" for materials and installation requirements for pathways.

3.02 INSTALLATION

- A. Comply with NECA 1.
- B. Comply with BICSI TDMM for layout and installation of communications equipment rooms.

- C. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- D. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.
 - 1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 2. Record agreements reached in meetings and distribute them to other participants.
 - 3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
 - 4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
- E. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

3.03 EQUIPMENT RACKS

- A. Install, assemble, mount and connect devices and equipment in the respective equipment racks, bolted securely to the rack frame with stainless steel hardware. "Star" style lock washers shall be provided to insure an electrically continuous ground path between the equipment/devices and rack frames.
- B. Provide blank metal filler panels to close unused equipment "front" mounting space in equipment racks, manufacturer's standard finish color.
- C. Provide a copper wire outlet connector in the respective equipment rack for each remote copper wire computer workstation outlet and copper wire cable shown connected to the respective equipment rack. The copper wire outlet connectors in the equipment racks shall be provided in equipment rack mounted copper wire patch panels.
- D. Terminal racks, equipment locations, patch panels, and cross connects shall be arranged to allow for natural cabling progression, minimize crossing of cables and allow easy access to each system component.
- E. Equipment Rack Anchorage:
- F. Securely anchor floor standing racks to the floor at each corner and the adjacent wall at the top of the rack.
- G. Securely anchor wall-mounted racks to the wall at four corners.

- H. Mounting method shall support the total rack weight including installed equipment, but in no case less than 500 pounds with a 2.0 times safety factor.

3.04 SLEEVE AND SLEEVE SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.05 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-B, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.
- D. A firestop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
- E. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
- F. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed in the state where the work is to be performed. A drawing showing the proposed firestopped system, stamped/embossed by the cognizant PE shall be provided to the District's Technical Representative prior to installing the firestop system.
- G. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.06 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Telecommunications Systems" for grounding conductors and connectors.
- B. Grounding and bonding shall comply with CEC, NFPA-70, J-STD-607-B, UL467 and the BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- C. Provide #6 AWG green insulated copper ground wire with fiber optic cable from main telecom grounding bus bar located at MDF room to IDF location and terminate to ground bar in IDF.
- D. All racks, cabinets, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the Telecommunication Room or Equipment Room shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack do not have sufficient metal to metal

contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #12 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack-mount equipment. The conductor shall be continuous; attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.

- E. All wires used for telecommunications grounding purposes shall be identified with green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.
- F. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- G. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
- 1. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

3.07 LABELING AND IDENTIFICATION

- A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
- C. Comply with requirements in Section 099123 "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- D. Identification tags shall include the following information:
 - 1. Installation month and date (i.e. 3/2004, 4/2005, etc.)
- E. Labels shall be preprinted or computer-printed type.
- F. The labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
 - 1. Label the faceplate at the fiber optic tray to correspond to each cable terminated.
 - 2. On the face plate of the patch panel, provide a $\frac{3}{4}$ " by $\frac{3}{4}$ " label with a letter or number identifying the patch panel designation.
- G. Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.

- H. Labeling shall follow recommended EIA/TIA standards and as requested by the School District to match site condition. Contractor shall confirm labeling pattern prior to final identification and testing. Labeling for new sites shall identify "IDF# / Room# / outlet #". All test results shall be identified by the final labeling scheme.

3.08 RECORD DRAWINGS

- A. The installation contractor will be provided with two sets of drawings at the start of the project. One set will be designated for the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis, and will be available to the Technical representative upon request during the course of the project. Anticipated variations from the building drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by the District. Contractor shall also redraw, with AutoCAD version 2007 or newer, the site and floor plans showing all fiber, copper, racks, and information outlets as well as the labeling scheme for all items. These CAD drawings shall be on 8-1/2" x 11" sheets of paper and disk, and be turned over to the District with the O&M manuals.
- B. The Contractor shall provide the central drawing set to the District at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cable system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

3.09 FIELD QUALITY CONTROL

- A. 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.
- B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminal are identified. Provide a list of final tap settings of paging speaker line matching transformers.
- C. Testing:
 - 1. Provide all instruments for testing and demonstrating in the presence of the District'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 District 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 and or all of the equipment on the basis of the results thereby obtained.

3.10 CLEANING AND PROTECTION

- D. 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.

3.11 WARRANTY

- A. 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 District.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the District after the end of the guarantee period.
- C. 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.
- D. Manufacturer Warranty
 - 1. The contractor shall facilitate a 25-year system performance warranty between the manufacturer and the District. An extended component warranty shall be provided which warrants functionality of all cabling and connectivity components used in the system for 25 years from the date of acceptance. The performance warranty shall warrant the installed horizontal copper and both the horizontal and the backbone optical fiber portions of the cabling system. Copper and fiber optic links shall be warranted to the link or channel performance as defined in ANSI/EIA-568-C.
 - 2. Upon completion of the project, the customer's technical representative will perform a final inspection of the installed cabling system with the contractor's project foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the customer.
 - 3. Upon receipt of the test documentation, the customer reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Customer testing will use the same method employed by the contractor, and minor variations shall be allowed to account for differences in test equipment and test variability. If significant discrepancies are found, the contractor will be notified for resolution.
 - 4. During the three week period between final inspection and delivery of the test and as-built documentation, the customer will activate the cabling system. The customer will validate operation of the cabling system during this period.

5. Completion of the installation, in-progress and final inspections, receipt of the test, receipt of the as-built documentation, and successful performance of the system for a two week period will constitute acceptance of the system.

END OF SECTION

SECTION 271300

COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All applicable portions of Division 26 and Division 27 shall apply to this section as though written herein completely.

1.02 SUMMARY

- A. Section Includes:
 - 1. Pathways.
 - 2. UTP Cable.
 - 3. Optical Fiber Cable.
 - 4. Cable identification products.

1.03 SCOPE OF WORK

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

1.04 DEFINITIONS

- A. Backbone: A facility (e.g., pathway, cable, or conductors) between telecommunications rooms or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.
- B. BDF: Building Distribution Frame (same location as MDF)
- C. BICSI: Building Industry Consulting Service International.

- D. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.
- E. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- F. EMI: Electromagnetic interference.
- G. Horizontal Cabling: Cabling between and including the telecommunications outlet/connector and the horizontal cross-connect. Also the cabling between and including the building automation system outlet or the first mechanical terminations on the horizontal connection point and the horizontal cross-connect.
- H. IDC: Insulation displacement connector.
- I. IDF: Intermediate Distribution Frame
- J. LAN: Local area network.
- K. MDF: Main Distribution Frame
- L. MTR: Main Telephone Room
- M. RCDD: Registered Communications Distribution Designer.
- N. RMC: Rigid metallic conduit.
- O. UTP: Un-shielded twisted pair cable.

1.05 BACKBONE CABLING DESCRIPTION

- A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.06 PERFORMANCE REQUIREMENTS

- A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.07 QUALIFICATIONS

- A. The installing Electronic Contractor must be an CommScope certified contractor. Provide a copy of Contractor's certification with bid package. The Installing Electronic Contractor shall be an authorized Commscope business partner and shall provide 25 years extended product warranty and application assurance on this installation.

- B. The Installing Electronic Systems Contractor shall hold a valid State of California C-7 license for all low voltage installations and a State of California C-10 License for any related high-voltage applications and shall have completed at least twenty projects including five projects with Grossmont Union High School District of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least ten years, and capable of being bonded to assure the District of performance and satisfactory service during the guarantee period.
- C. The Installing Electronic Systems Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The 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.

1.08 SUBMITTALS

- A. Shop Drawings:
 - 1. Include dimensioned plan and elevation views of telecommunications equipment rooms, labeling each individual component. Show equipment rack assemblies, method of field assembly, workspace requirements, and access for cable connections.
 - 2. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by District.
 - 3. Cabling Administration Drawings.
- B. Wiring diagrams to show typical wiring schematics including the following:
 - 1. Patch cords (Fiber Optic). Fiber-optic enclosures.
 - 2. Distribution blocks.
- C. Qualification Data: For Installer.
- D. Example copy of copper and fiber test reports.
- E. Submit manufacturers' product data sheets for each component of the voice, data and IP speaker-clock systems. Certify that the data sheets depict the components to be provided by the Contractor to make up the complete system as described in this specification. Submit details of the warranty (including manufacturer warranties) to be provided for the cabling systems, clearly indicating that all components are covered.
- F. Submit samples of the labels to be used for labeling cables, patch panels, termination frames, and faceplates for the telephone and data systems.
- G. Submit a testing schedule indicating how each voice, data and IP speaker-clock cabling system component is to be tested. The schedule shall, as a minimum, indicate the testing process from factory testing through to final acceptance testing. The schedule shall list (by part number) testing equipment that will be used and detail each step of each test to be performed. The schedule shall list the criteria that will be applied to each test of each component of the telephone and data cabling systems. The schedule shall include the test results form that will be filled in by the tester as each component is tested.

- H. Submit references for a minimum of twenty similar projects successfully undertaken and completed within the last ten years. As a minimum, provide project name and address, client contact name and telephone number, and construction manager name and telephone number. Provide a brief description of each project indicating types of systems installed, quantities and configurations of outlets, and projected time scales.
- I. Once samples have been submitted, reviewed by the School District Representative and approved they shall be retained. The samples shall be used as the standards by which the quality of work on the project by the Contractor shall be judged. Any installation, which does not meet this Once samples have been submitted, review by the School District Representative and approved, they standard, shall be replaced or reworked as approved by the School District Representative.

1.10 AS BUILT DOCUMENTATION

- A. Faceplate labeling, cable termination numbering, patch panel and fiber enclosure identification shall be coordinated with School District Representative.
- B. The as-built documentation shall consist of prints with the station location numbers (faceplate identification numbers) inserted next to the symbol for the location.
- C. The prints shall also contain the cabling routes taken between the cable tray, conduit and/or J-Hooks and the workstation areas.
- D. An additional requirement shall be a wire run list created in Microsoft Excel that contains the specific details of each location and all of the cables that are terminated there. Create separate tabs in the spreadsheet for MDF and each IDF.

1.11 COORDINATION

- A. Coordinate layout and installation of voice, data and IP speaker-clock cabling with District's Representative.
- B. Meet jointly with telecommunications and LAN equipment suppliers and District to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 1. Record agreements reached in meetings and distribute to other participants.
 - 2. Adjust arrangements and locations of distribution frames and cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

1.12 APPLICABLE STANDARDS

- A. The equipment shall be U.L. listed labeled, and approved for the application shown in the contract documents.
- B. The complete system material, equipment, testing, installation and workmanship shall comply with requirements of:
 - 1. This Technical Specification and Associated Drawings.

2. ANSI/TIA 568-C.0 Generic Telecommunications Cabling for Customer Premises
 3. ANSI/TIA 568-C.1 Commercial Building Telecommunications Cabling Standard
 4. ANSI/TIA 568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 5. ANSI/TIA 568-C.3 Optical Fiber Cabling Components Standard
 6. EIA/TIA-TSB-36 Technical Systems Bulletin, Additional Cable Specifications for Unshielded Twisted-Pair Cables - All applicable revisions and addendums.
 7. TIA/EIA-TSB-40 Telecommunications Systems Bulletin, Additional Transmission Specifications for Unshielded-Pair Connecting Hardware – All applicable revisions and addendums.
 8. TIA/EIA-TSB-75 Telecommunications System Bulletin, Additional Transmission Specifications for Unshielded Twisted-Pair consolidation points and cabling – All applicable revisions and addendums.
 9. ANSI/EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces – All applicable revisions and addendums.
 10. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings – All applicable revisions and addendums.
 11. J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications – All applicable revisions and addendums.
 12. Building Industries Consulting Services, International (BICSI) Telecommunications Distribution Methods Manual (TDMM) - All applicable revisions and addendums.
 13. TIA TSB62-23 Telecommunications Systems Bulletin, Measurement of the Non-linear coefficient of single-mode fibers – All applicable revisions and addendums to these documents.
 14. CEC
- C. Products, services, and materials provided by the Contractor shall be new and of high quality and free of faults and defects.
- D. Provide products, services, and materials as specified in this document. Substitution of products, services, or materials will only be considered if the Contractor follows procedures and requirements specified in Division 1.

1.13 SYSTEM TESTING

- A. Following voice, data, IP speaker-clock and fiber optic cable installation and termination at both ends, undertake and record tests to ensure that the cabling system will perform satisfactorily in service. In addition to the tests detailed in this

specification, the Contractor shall carry out any additional tests that he deems necessary to ensure the satisfactory operation of the telephone, data, and fiber optic cable systems. The costs of these additional tests shall be borne by the Contractor.

- B. Provide the School District Representative with the opportunity to witness all testing. On request, the installer shall demonstrate that the test procedure competently identifies the fault conditions being tested for.
- C. Complete the tests identified in all of the voice, data and IP speaker-clock system specifications.
- D. Notify the District Representative fourteen working days before the date of commencement of the cable tests. Provide details, on that advance date, of proposed tests, the test schedule, equipment to be used, its certification and calibration, and the names and qualifications of test personnel.
- E. Personnel shall be competent in and qualified by experience or training for detailed design, installation, and testing of voice, data, and fiber optic cable systems.
- F. Include the cost of obtaining, calibrating, and maintaining test equipment, and the cost of carrying out and recording the tests, including labor costs, in the bid sum.
- G. Ensure that all Test Equipment is in calibration before delivery to site and throughout the testing period. The installer shall be responsible for ensuring that any necessary tests and rework to maintain equipment's calibration status are carried out.
- H. To support the test procedure, create a printed table of every cable in the building with appropriate columns for each test result and comments.
- I. Sign and date each successful series of test results as the tests proceed. As a minimum, each completed page of test results shall be signed and dated once all the tests on that page have been successfully completed and their results recorded.
- J. The test documentation shall be available for inspection by the School District Representative during the installation period and the original documents (not copies or retyped versions) shall be passed to the School District Representative within five working days of completion of tests on cables in each area. The installer shall retain a copy to aid preparation of as-built information.
- K. Failures detected during the testing shall be duly noted on the test results schedule and rectified. On the fault being rectified, this shall also be noted. These notes shall not be deleted or obliterated.
- L. Rectification of all damaged cables shall include replacing damaged cables with new cables in complete runs or remaking poor terminations. In-line cable joints, splices, or distribution points are not acceptable. All damaged cables shall be removed from site.

1.14 QUALIFICATIONS

- A. The supplier of the equipment shall be an authorized CommScope and service facility.
- B. Extend material and Performance Warranties.

1. The contractor shall facilitate and extend to the District all manufacturers' warranties for all products installed. Extended system (performance) and component warranties shall be provided which warrants functionality of all existing and new components (cable, connecting hardware and patch cords) used in the system for a minimum of (25) twenty-five years from the date of acceptance. Each component of the system shall be covered for defects in materials and workmanship. Copper links shall be warranted against the link performance minimum expected results defined in the TIA/EIA SP-2840A, Annex E. Fiber optic links shall be warranted against the link and segment performance minimum expected results defined in the TIA/EIA SP-2840A, Annex H. All fiber and copper cabling, termination components, and ancillary devices shall be of one manufacturer to insure no disputes can arise between different manufacturers' if performance problems arise. Installers shall be factory trained technicians with a factory trained supervisor overseeing the project.
 2. Warranty scope includes, but is not limited to, network cables and terminations, network workstation plug-in outlets, and patch panel plug-in outlets, cable splices and connectors.
 3. Repair or replace the defective material at the project premise, to comply with the performance standards outlined in the contract documents during the warranty period.
 4. All newly installed fiber optic cabling and any existing fiber optic cabling which was disconnected/reconnect during the course of this project shall require complete link test in accordance with the testing requirements specified elsewhere in this document, and require an CommScope 25-Year warranty.
 5. In addition to the manufacturer warranties, the Contractor shall provide their own 2-year warranty covering all aspects of the project to include workmanship.
 6. Contractor is responsible
 7. Upon successful completion of the installation and subsequent inspection, the District's Project Manager shall be provided with a numbered certificate, from the manufacturing company, registering the installation.
 8. All conditions for obtaining the manufacturers' warranty shall be the sole responsibility of the contractor.
- C. The structured cabling system shall be an CommScope end-to-end solution. No equal. All equipment must be approved by District (Technology and Information Services).

1.15 QUALITY ASSURANCE

- A. Work shall be done by a qualified CommScope Contractor holding licenses required by legally constituted authorities having jurisdiction over the work. Contractor shall have completed at least ten (10) projects of equal scope to systems described herein and shall have been engaged in business of supplying and installing specified type of systems for at least 5 years.

- B. Contractor shall warranty all work executed and materials furnished shall be free from defects of material and workmanship for a period of two (2) years from acceptance date of Contract Completion. Immediately upon receipt of written notice from the District, Contractor shall repair or replace at no expense to the District: Any defective material or work which may be discovered before final acceptance or work, or within warranty period; any material or work damaged thereby; and adjacent material or work which may be displaced in repair or replacement.
- C. Examination of or failure to examine work by the District shall not relieve Contractor from these obligations.
- D. If Contractor fails to repair or replace material or work indicated above within 7 days of receiving written notice, the District, with its own personnel or by Contract, may proceed with repair or replacement and assess cost against Contractor, if Contractor does not respond accordingly.
- E. Persons skilled in trade shall install system in accordance with best trade practice. Further, in accordance with all applicable building codes. Contractor and all contractors' employees terminating cable to wiring terminating devices shall be certified by the manufacturer of the wiring device. Copies of certificates shall be provided to the District Representative prior to the start of work.

1.16 WARRANTY

- A. 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 District.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the District after the end of the guarantee period.
- C. 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.
- D. Manufacturer Warranty
 - 1. The contractor shall facilitate a 25-year system performance warranty between the manufacturer and the District. An extended component warranty shall be provided which warrants functionality of all cabling and connectivity components used in the system for 25 years from the date of acceptance. The performance warranty shall warrant the installed horizontal copper and both the horizontal and the backbone optical fiber portions of the cabling system. Copper and fiber optic links shall be warranted to the link or channel performance as defined in ANSI/EIA-568-C.
 - 2. Upon completion of the project, the customer's technical representative will perform a final inspection of the installed cabling system with the contractor's project foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the customer.

3. Upon receipt of the test documentation, the customer reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Customer testing will use the same method employed by the contractor, and minor variations shall be allowed to account for differences in test equipment and test variability. If significant discrepancies are found, the contractor will be notified for resolution.
 4. During the three week period between final inspection and delivery of the test and as-built documentation, the customer will activate the cabling system. The customer will validate operation of the cabling system during this period.
- E. Completion of the installation, in-progress and final inspections, receipt of the test, receipt of the as-built documentation, and successful performance of the system for a two week period will constitute acceptance of the system

PART 2 - PRODUCTS

2.01 FIBER OPTIC BACKBONE CABLE

- A. Provide Commscope Outside Plant (OSP) Dielectric 12 strands 50/125mu Multimode XG OM4 Fiber Optic cable from MDF to IDF cabinet. Provide 20' service loop at both ends. Provide 6' long fiber optic patch cables at each MDF and IDF. Single mode fiber optic cable is not acceptable. Commscope PN#6 - 15533475.
- B. Fiber Optic Cable shall be one continuous length without any splicing. All fibers in a multi-fiber cable shall be fully operational within the performance characteristics prior to and after installation. The use of spare fibers in the cable to compensate for defective fibers is not permitted. Defective cable shall be removed and replaced with fully functional cable at no additional cost to the contract.
- C. Fiber Optic Cable shall be UL listed, complying with CEC and ETL verified to meet or exceed specified requirement.
- D. Provide "SC" type termination connector at each end of all fiber optic cables. SC connectors shall be ceramic aluminum oxide 2.5mm ferrule, multi-cure ultra violet or heat cured epoxy bonded to match cable fiber. Insertion loss of each mated connector shall be less than 0.3 dB. Provide dust cover cap for each connector.
- E. All fiber cable shall be rated for the space that it is installed. Cables installed in underground conduit shall be loose tube gel filled with rated jacket.
- F. Label all fiber optic cable with permanent orange tags. Labeling shall follow the guidelines of ANSI/TIA/EIA – 606-A.

2.02 GROUNDING AND BONDING

- A. Grounding and bonding shall comply with CEC, EIA/TIA-607 and UL467.
- B. Provide #6 AWG green insulated copper ground wire with fiber optic cable from main telecom grounding bus bar located at MDF room to IDF location and terminate to ground bar in IDF.

- C. All racks, cabinets, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the Telecommunication Room or Equipment Room shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack do not have sufficient metal to metal contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #12 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack-mount equipment. The conductor shall be continuous; attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.
- D. All wires used for telecommunications grounding purposes shall be identified with green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.

PART 3 - EXECUTION

3.01 CABLE INSTALLATION

- A. Cables connecting to equipment racks shall be installed with not less than six feet of slack cable between the equipment rack/terminal block and terminal backboard. The slack cable shall be coiled and supported on the backboard and/or cable tray.
- B. Cables shall be trained, dressed and racked on the plywood backboards. Provide cable, metal support arms and re-enterable type cable support rings not less than 12 inches on center mounted onto the plywood along the entire length of all cables.
- C. No single cable run shall exceed 290 feet from patch panel to device without written direction from the District IS personnel.
- D. Provide 36 inches of cable slack at workstation outlets.
- E. Provide cables installed from individual computer/data workstation outlets to respective terminal closet/room equipment rack patch panel. Cables shall be continuous without cutting or splices.
- F. Minimum bending radius of fiber optic cables shall not be less than 12-inches. Maximum pulling tension shall not exceed 25 pounds. In no case shall the manufacturer's recommendations be violated.
- G. The minimum bending radius for copper wire cables shall be 10 times the cable outside diameter. The maximum pulling tension and minimum bending radius shall not violate manufacturer's recommendations.
- H. Cable lengths over 50 feet shall be machine pulled and not hand pulled. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum cable pulling speed shall be greater than 15 feet per minute.
- I. A dynamometer to measure pulling tension shall be used on all cable runs in excess 200 feet or with more than 180 degrees in bends. The actual pulling tension value

shall be calculated and recorded for each pull. A written report will be provided to the District.

- J. The portions of cables installed without raceways or cable tray supports shall be installed with "j-hood" cable supports.
 - 1. The "J-hooks" shall provide multi-tiered "treed" "J" shared hooks, with wide flat cable support base (0.5"W minimum) and smooth rounded corners, specifically designed for Category-6 and fiber optic cable support. As manufactured by Erico Inc or substitution of equal or better and approved by the District.
 - 2. The individual "J-hook" attachment to the building structure shall be "beam clamp", "hanger rod", clevis hanger styles.
 - 3. Install "J-hooks" not more than 36 inches on center along the entire cable length, at each cable change in direction, to insure less than 6 inches of cable sag between adjacent hooks. Secure cables to "J-hooks" with cable tie wraps. "J-hooks" supported cables, bundle cables together with tie wraps.
 - 4. "Bridle rings" shall not be used to support cables.
 - 5. Cables shall not rest directly on ceilings, ceiling hangers, lighting fixtures, air ducts, piping, or equipment.
- K. In each conduit to be used for fiber cable provide four (4) 1-inch Innerduct with "Jack-moon" plugs.
- L. All copper horizontal cables shall be installed in the following manner:
 - 1. Cable raceways shall not be filled greater than the CEC maximum fill for the particular raceway type
 - 2. Cables shall be installed in continuous lengths from origin to destination (no splices) unless specifically addressed in this document
 - 3. Cable splices are not allowed.
 - 4. The cable's minimum bend radius of 4 times the cable diameter and maximum pulling tension of 25 lbs. shall not be exceeded
 - 5. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of four-foot intervals – at no point shall cable(s) rest on acoustic ceiling grids or panels
 - 6. Horizontal distribution cables shall be bundled in groups of not greater than 40 cables (cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle)
 - 7. Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware
 - 8. The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices
 - 9. Cables shall not be attached to ceiling grid or lighting support wires

10. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the District
 11. Cables shall be identified by a self-adhesive label in accordance with the District standards.
 12. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate
 13. Unshielded twisted pair cable shall be installed so that there are no bends less than four times the cables outside diameter (4 X cable O.D.) at any point in the run
 14. Pulling tension on 4-pair UTP cables shall not exceed 25-pounds for a single cable or cable bundle
 15. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B document, manufacturer's recommendations, and/or best industry practices
 16. Pair untwist at the termination shall not exceed 0.25 inch for connecting hardware
 17. Cables shall be neatly bundled and dressed to their respective panels or blocks
 18. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame
 19. The cable jacket shall be maintained as close as possible to the termination point
 20. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties
- M. Provide nylon pull strings with all cable runs, conduit stub ups, conduit sleeves, cable trays, open wiring routes, Innerduct, and spare. Pull strings shall be free from cable bundles in open wiring routes.
- N. Provide Velcro cable management straps on all copper cable bundles, the last 20 feet or upon entry into equipment closet, a maximum of 12" apart, on the rear of the equipment racks and on the patch cords within the vertical cable managers. Straps shall be a maximum of 12" apart.
- O. Provide protective bushings at the ends of all exposed conduits used for the data system cabling. This is to include all conduits installed for any future data cabling requirements.

3.02 HANDLING OF CABLE REELS

- A. Cable ends shall be sealed prior to shipment to prevent moisture entry into cable. Cable ends shall remain sealed at all times including during installation. Where ends seals are removed, reseal cable ends by stripping cable finishes back 2" down to insulation. Then apply four layers of an insulating tape criss-cross over the cable end

and carry back at least 4" onto cable outer finish. Add a containing cover of two layers of vinyl electrical tape completely over the end seal.

- B. Cable reels shall be shipped with factory applied lagging (protective cover) left in place until removal is absolutely necessary. Store reels of cable on a firm surface, paved, or on planking to prevent settling into soft ground.

3.03 CABLE TERMINATIONS

A. General

1. Computer/data workstation outlets connecting to ports in patch panels shall be grouped together in the patch panel by outlet, room location and building area location. Each group shall be identified with engraved (etched) nameplates indicating grouping identification and individual port numbers.
2. Polarity and color coding of cable connections at splices, terminations and outlets shall be consistently maintained throughout the entire electronic network system.
3. Terminate all cables onto respective outlets and terminals. Terminations shall comply with manufacturer's recommendations.

B. Fiber Optic Terminations

1. Individual fiber optic fibers shall each be terminated with a fiber optic fiber connector. The connector for each fiber shall be "plugged" into separate fiber optic fiber interconnection couplers on the rear of each respective outlet.
2. Each fiber optic termination ferrule shall be inspected, after completion of the termination, visually with a fiber optic inspection microscope and an interferometer, to insure fiber "undercut", "protruding" fiber, over polish and under polish of fiber termination ends does not exist in the finished termination ferrule.
3. Fiber optic cables terminated between two fiber optic patch panels located in separate equipment racks. The fibers shall be paired together for purposes of identification. Each pair of fibers shall be "plugged" into separate, physically adjacent fiber optic fiber interconnection couplers at each patch panel. The horizontal/vertical arrangement of paired patch panel fiber couplers shall match at both ends of the fiber cable.

C. Copper Wire Terminations

1. Unless specifically directed otherwise by the District's Representative, Pin assignment for wiring terminations shall comply with ANSI/EIA/TIA 568b.

3.04 CIRCUIT TERMINAL ROOMS AND CLOSETS

- A. Provide conductor/cable training and racking support distribution rings installed on backboards. Support rings shall be spaced a minimum of 10 inches on center along all cable/conductor routing paths on backboards and within 4 inches of each change in cable/conductor direction. As manufactured by Newton 3042 series, Saunders or equal with District approval.

3.05 LABELING AND IDENTIFICATION

- A. Fiber optic and copper wire cables shall be identified in each pull box, equipment rack and computer workstation outlet. Identification tags shall include the following information:
 - 1. Installation month and date (i.e. 3/2011, 4/2012, etc.)
 - 2. Conductor size conductor type (i.e. loose tube fiber; (#24 AWG UTP Category 3, 200 pair, telephone/voice etc.).
 - 3. Tag type to match existing site condition.
 - 4. Label the faceplate at the fiber optic tray to correspond to each cable terminated.
- B. Additional Labeling:
 - 1. Camera – CAM
 - 2. Projector – AV
- C. Each cable run shall be permanently labeled at each end with a unique sequential number which corresponds to a similar number provided for each data outlet and punch down point. A printed label shall be placed at each of the following locations:
 - 1. On cable at the rear of the patch panel or termination block, provide self-laminating wrap around label, Brady Label self-laminating 1.2" by 1.5" wrap around label #29689 or equal to match site condition.
 - 2. On each cable in the j-box behind the faceplate location. Provide self-laminating wrap around label, Brady Label self-laminating 1.2" by 1.5" wrap around label #29689 or equal to match site condition.
 - 3. On the face plate of the patch panel, provide a $\frac{3}{4}$ " by $\frac{3}{4}$ " label with a letter or number identifying the patch panel designation.
 - 4. On the face of the faceplate in the label holder window.
- D. The labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
- E. All label printing will be machine generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, approximately sized to the outside diameter of the cable, and placed within view at the termination point on each end. Outlet labels will be the manufacturer's label provided with the outlet assembly.
- F. Hand written labels are not permitted. Where cable ID includes room number identification the contractor shall obtain written verification of actual room numbers from school site prior to beginning labeling (numbers on plans do not always match actual room numbers). Cable pulling cross reference lists will not be accepted with final documentation.
- G. Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.

- H. All faceplates shall be identified with permanent printed labels. Labels must not be subject to removal by incidental contact. Contractor shall be responsible for replacing defective labeling for a period of one year from date of final sign-off of project.
- I. All fiber optic and UTP feed cables shall be identified with a permanent, water resistant, printed labels at the fiber shelf. Labeling information shall include closet identifications, quantity of conductors (UTP) or strands of (fiber) and house pair designations (UTP).
- J. Labeling shall follow recommended EIA/TIA standards and as requested by the School District to match site condition. Contractor shall confirm labeling pattern prior to final identification and testing. Labeling for new sites shall identify "IDF# / Room# / outlet #". All test results shall be identified by the final labeling scheme.
- K. All fiber optic cables and/or innerduct shall be tagged with orange fiber optic warning tags in every manhole and/or pull box. Fiber warning tags shall also be placed at each end of the cable in the termination closets in clear view. A minimum of (3) tags are required at each end. Fiber warning tags shall be placed on fiber optic cable and/or innerduct routed through open ceiling environments at increments no less than 10 feet apart.

3.06 CABLE SYSTEM TESTING

- A. All cables and termination hardware shall be 100% tested for defects in installation to verify cable performance under installed conditions. All conductors of each installed cable shall be verified useable by the contractor prior to system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
- B. Each copper cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair data cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. All category 6 cables shall be tested to ensure the category 6 standard performance to 500Mhtz is complied with. All tests shall be printed out in hard copy in the quantity called out in the general specifications for O&M and turn over documents as well as one disc copy for the Districts use. All test reports shall be delivered to the District prior to project close out. Data cables shall be tested using a (Fluke – DSP 4000 series or equivalent) cable analyzer.
- C. Continuity
 - 1. Each pair of each installed cable shall be tested using a "green light" test set that shows opens, shorts, polarity and pair-reversals. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicted by the test set in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.

D. Length

1. Each installed cable shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in identification number and circuit or pair number. For multi-pair cables, the longest pair length shall be recorded as the length for the cable.
2. Near End Cross-Talk (NEXT)
3. Attenuation
4. Ambient Noise
5. Attenuation to Cross-Talk Ratio (ACR)
6. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

E. Fiber

1. All fiber terminations shall be visually inspected with a minimum 200X microscope to ensure that no surface imperfections exist after final polishing. In addition, each fiber strand shall be tested for attenuation with an optical power meter and light source as well as an OTDR. Cable length and splice attenuation shall be verified using an OTDR.

F. Attenuation

1. Horizontal distribution multimode optical fiber attenuation shall be measured at either 850 nanometers (nm) or 1300 nm using an LED light source and power meter. Backbone multimode fiber shall be tested at both 850 nm and 1300 nm in one direction. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B. One 2-meter patch cord shall be used for the test reference and two 2-meter patch cords shall be used for the actual test. This test method uses a one jumper reference, two jumper test to estimate the actual link loss of the installed cables plus the loss of two connectors. This measurement is consistent with the loss which network equipment will see under normal installation and use. Test evaluation for the panel to panel (backbone) or panel to outlet (horizontal) shall be based on the values set forth in the ANSI/TIA 568-C.3, Optical Fiber Link Performance Testing.
2. Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the District and the Contractor prior to the start of the test.

3. Test evaluation for the panel to panel (backbone) shall be based on the values set forth in the ANSI/TIA 568-C.3, Optical Fiber Link Performance Testing.

G. Length and Splice Loss

1. Each cable shall be tested with an Optical Time Domain Reflectometer (OTDR) to verify installed cable length and splice losses. The OTDR measurements for length shall be performed in accordance with EIA/TIA-455-60. The measurements to determine splice loss shall be performed in accordance with manufacturer's recommendations and best industry practices. These tests shall be employed on all cables after installation and in addition where one or more of the following conditions exist.
2. OTDR and power meter testing is specifically requested by the District.
3. Each strand shall be tested on all outside plant and tight-buffered cables.
4. A representative strand of each fiber cable shall be tested to verify length if the estimated cable length is within 10% of the maximum length specified, respective to cable function, in the ANSI/TIA 568-C Standard.

H. Test Documentation

1. Test documentation shall be provided in a three-ring binder(s) within three weeks after the completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs, Horizontal and Backbone. Each major heading shall be further sectioned by test type. Within the horizontal and backbone sections, scanner test results (Category 3, 4, or 5), fiber optic attenuation test results, OTDR traces, and green light test results shall be segregated by tab. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test.
2. Scanner tests shall be printed on 8-1/2" x 11". Hand written test results (attenuation results and green light results) shall be documented on an Excel spreadsheet. OTDR test results shall be printed or attached and copied on 8-1/2" x 11" paper for inclusion in the test documentation binder. Provide spreadsheet on a CD
3. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collated in the binder.

3.07 RECORD DRAWINGS

- A. The installation contractor will be provided with two sets of drawings at the start of the project. One set will be designated for the central location to document all as-built

information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis, and will be available to the Technical representative upon request during the course of the project. Anticipated variations from the building drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by the District. Contractor shall also redraw, with AutoCAD version 2004 or newer, the site and floor plans showing all fiber, copper, racks, and information outlets as well as the labeling scheme for all items. These CAD drawings shall be on 8-1/2" x 11" sheets of paper and disk, and be turned over to the District with the O&M manuals.

- B. The Contractor shall provide the central drawing set to the District at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cable system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

3.08 FIRESTOP SYSTEMS

- A. A firestop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
- B. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
- C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE, licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed firestopped system, stamped/embossed by the cognizant PE shall be provided to the District's Technical Representative prior to installing the firestop system.
- D. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.09 FIELD QUALITY CONTROL

- A. 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.
- B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminal are identified. Provide a list of final tap settings of paging speaker line matching transformers.
- C. Testing:

1. Provide all instruments for testing and demonstrating in the presence of the District'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 District 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 and or all of the equipment on the basis of the results thereby obtained.

3.10 CLEANING AND PROTECTION

- A. 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.

END OF SECTION

SECTION 27 15 00

COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. All applicable portions of Division 26 and Division 27 shall apply to this section as though written herein completely.

1.02 SCOPE OF WORK

- A. The work under this section shall consist of all cabling, outlets, cabinets, patch panels, and associated material for a complete voice, data system as shown on the plans and as specified herein.

1.03 RELATED WORK

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.
 - 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.
 - 2. All conduits, outlet boxes, back boxes, junction boxes, terminal cabinets, backboards, wiring, cables, equipment, devices, etc. unless existing, shall be furnished and installed complete under this section. Conduit and junction box sizes shall be determined by the Installing Electrical Contractor for the particular wire and cable fills required for the systems installed. (Conduit sizes shall comply with the California Electrical Code). The entire responsibility of the system, including the installation, operation, function, testing and maintenance for one (1) year after final acceptance under this section shall be the responsibility of the installing electronic contractor.
 - 3. The Installing Electronic Systems 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.

1.04 QUALIFICATIONS

- A. The installing Electronic Contractor must be an CommScope certified contractor. Provide a copy of Contractor's ND & I certification with bid package. The Installing Electronic Contractor shall be an authorized AMP ND & I business partner and shall

provide 25 years extended product warranty and application assurance on this installation.

- B. The Installing Electronic Systems Contractor shall hold a valid State of California C-7 license for all low voltage installations and a State of California C-10 License for any related high-voltage applications and shall have completed at least twenty projects including five projects with Grossmont Union High School District of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least ten years, and capable of being bonded to assure the District of performance and satisfactory service during the guarantee period.
- C. The Installing Electronic Systems Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The 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.

1.05 DEFINITIONS

- A. Backbone: A facility (e.g., pathway, cable, or conductors) between telecommunications rooms or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.
- B. BDF: Building Distribution Frame (same location as MDF)
- C. BICSI: Building Industry Consulting Service International.
- D. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.
- E. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- F. EMI: Electromagnetic interference.
- G. Horizontal Cabling: Cabling between and including the telecommunications outlet/connector and the horizontal cross-connect. Also the cabling between and including the building automation system outlet or the first mechanical terminations on the horizontal connection point and the horizontal cross-connect.
- H. IDC: Insulation displacement connector.
- I. IDF: Intermediate Distribution Frame
- J. LAN: Local area network.
- K. MDF: Main Distribution Frame
- L. MTR: Main Telephone Room
- M. RCDD: Registered Communications Distribution Designer.
- N. RMC: Rigid metallic conduit.
- O. UTP: Un-shielded twisted pair cable.

1.06 SUBMITTALS

- A. Provide three (3) full-size installation samples of the voice, data and IP speaker-clock system outlet. The sample shall include, as a minimum, the faceplate, two data and two voice system connectors (each terminated with a 12" length of distribution cabling) two blanking plates, and back boxes.
- B. Shop Drawings:
 - 1. Include dimensioned plan and elevation views of telecommunications equipment rooms, labeling each individual component. Show equipment rack assemblies, method of field assembly, workspace requirements, and access for cable connections.
 - 2. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by District.
 - 3. Cabling Administration Drawings.
- C. Wiring diagrams to show typical wiring schematics including the following:
 - 1. Workstation outlets, jacks, and jack assemblies.
 - 2. Patch cords (Category 6 and Fiber Optic). Copper patch panels and blocks.
 - 3. Fiber-optic enclosures.
 - 4. Distribution blocks.
 - 5. Equipment racks.
- D. Qualification Data: For Installer.
- E. Example copy of copper and fiber test reports.
- F. Submit manufacturers' product data sheets for each component of the voice, data and IP speaker-clock systems. Certify that the data sheets depict the components to be provided by the Contractor to make up the complete system as described in this specification. Submit details of the warranty (including manufacturer warranties) to be provided for the cabling systems, clearly indicating that all components are covered.
- G. Submit samples of the labels to be used for labeling cables, patch panels, termination frames, and faceplates for the telephone and data systems.
- H. Submit a testing schedule indicating how each voice, data and IP speaker-clock cabling system component is to be tested. The schedule shall, as a minimum, indicate the testing process from factory testing through to final acceptance testing. The schedule shall list (by part number) testing equipment that will be used and detail each step of each test to be performed. The schedule shall list the criteria that will be applied to each test of each component of the telephone and data cabling systems. The schedule shall include the test results form that will be filled in by the tester as each component is tested.
- I. Submit references for a minimum of twenty similar projects successfully undertaken and completed within the last ten years. As a minimum, provide project name and address, client contact name and telephone number, and construction manager name and telephone number. Provide a brief description of each project indicating types of systems installed, quantities and configurations of outlets, and projected time scales.
- J. Once samples have been submitted, reviewed by the School District Representative and approved they shall be retained. The samples shall be used as the standards by

which the quality of work on the project by the Contractor shall be judged. Any installation, which does not meet this Once samples have been submitted, review by the School District Representative and approved, they standard, shall be replaced or reworked as approved by the School District Representative.

1.07 AS-BUILT DOCUMENTATION

- A. Faceplate labeling, cable termination numbering, patch panel and fiber enclosure identification shall be coordinated with School District Representative.
- B. The as-built documentation shall consist of prints with the station location numbers (faceplate identification numbers) inserted next to the symbol for the location.
- C. The prints shall also contain the cabling routes taken between the cable tray, conduit and/or J-Hooks and the workstation areas.
- D. An additional requirement shall be a wire run list created in Microsoft Excel that contains the specific details of each location and all of the cables that are terminated there. Create separate tabs in the spreadsheet for MDF and each IDF.

1.08 COORDINATION

- A. Coordinate layout and installation of voice, data and IP speaker-clock cabling with District's Representative.
- B. Meet jointly with telecommunications and LAN equipment suppliers and District to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 1. Record agreements reached in meetings and distribute to other participants.
 - 2. Adjust arrangements and locations of distribution frames and cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

1.09 APPLICABLE STANDARDS

- A. The equipment shall be U.L. listed and labeled, and approved for the application shown in the contract documents.
- B. The complete system material, equipment, testing, installation and workmanship shall comply with requirements of:
 - 1. The Contract Documents
 - 2. ANSI/TIA 568-C.0 Generic Telecommunications Cabling for Customer Premises
 - 3. ANSI/TIA 568-C.1 Commercial Building Telecommunications Cabling Standard
 - 4. ANSI/TIA 568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards

5. ANSI/TIA 568-C.3 Optical Fiber Cabling Components Standard
 6. EIA/TIA-TSB-36 Technical Systems Bulletin, Additional Cable Specifications for Unshielded Twisted-Pair Cables-November, All applicable revisions and addendums.
 7. TIA/EIA-TSB-40 Telecommunications Systems Bulletin, Additional Transmission Specifications for Unshielded-Pair Connecting Hardware – All applicable revisions and addendums.
 8. TIA/EIA-TSB-75 Telecommunications System Bulletin, Additional Transmission Specifications for Unshielded Twisted-Pair consolidation points and cabling – All applicable revisions and addendums.
 9. ANSI/EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces – All applicable revisions and addendums.
 10. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings – All applicable revisions and addendums.
 11. J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications – All applicable revisions and addendums.
 12. Building Industries Consulting Services, International (BICSI) Telecommunications Distribution Methods Manual (TDMM) - All applicable revisions and addendums.
 13. TIA TSB62-23 Telecommunications Systems Bulletin, Measurement of the Non-linear coefficient of single-mode fibers – All applicable revisions and or addendums to these documents.
 14. CEC
- C. Products, services, and materials provided by the Contractor shall be new and of high quality and free of faults and defects.
 - D. Provide products, services, and materials as specified in this document. Substitution of products, services, or materials will only be considered if the Contractor follows procedures and requirements specified in Division 1.

1.10 SYSTEM TESTING

- A. Following voice, data, and fiber optic cable installation and termination at both ends, undertake and record tests to ensure that the cabling system will perform satisfactorily in service. In addition to the tests detailed in this specification, the Contractor shall carry out any additional tests that he deems necessary to ensure the satisfactory operation of the telephone, data, and fiber optic cable systems. The costs of these additional tests shall be borne by the Contractor.
- B. Provide the School District Representative with the opportunity to witness all testing. On request, the installer shall demonstrate that the test procedure competently identifies the fault conditions being tested for.
- C. Complete the tests identified in all of the voice, data and IP speaker-clock system specifications.

- D. Notify the District Representative fourteen working days before the date of commencement of the cable tests. Provide details, on that advance date, of proposed tests, the test schedule, equipment to be used, its certification and calibration, and the names and qualifications of test personnel.
- E. Personnel shall be competent in and qualified by experience or training for detailed design, installation, and testing of voice, data, and fiber optic cable systems.
- F. Include the cost of obtaining, calibrating, and maintaining test equipment, and the cost of carrying out and recording the tests, including labor costs, in the bid sum.
- G. Ensure that all Test Equipment is in calibration before delivery to site and throughout the testing period. The installer shall be responsible for ensuring that any necessary tests and rework to maintain equipment's calibration status are carried out.
- H. To support the test procedure, create a printed table of every cable in the building with appropriate columns for each test result and comments.
- I. Sign and date each successful series of test results as the tests proceed. As a minimum, each completed page of test results shall be signed and dated once all the tests on that page have been successfully completed and their results recorded.
- J. The test documentation shall be available for inspection by the School District Representative during the installation period and the original documents (not copies or retyped versions) shall be passed to the School District Representative within five working days of completion of tests on cables in each area. The installer shall retain a copy to aid preparation of as-built information.
- K. Failures detected during the testing shall be duly noted on the test results schedule and rectified. On the fault being rectified, this shall also be noted. These notes shall not be deleted or obliterated.
- L. Rectification of all damaged cables shall include replacing damaged cables with new cables in complete runs or remaking poor terminations. In-line cable joints, splices, or distribution points are not acceptable. All damaged cables shall be removed from site.

1.11 QUALIFICATIONS

- A. The supplier of the equipment shall be an authorized Commscope distributor and service facility.
- B. Extend material and Performance Warranties.
 - 1. The contractor shall facilitate and extend to the District all manufacturers' warranties for all products installed. Extended system (performance) and component warranties shall be provided which warrants functionality of all existing and new components (cable, connecting hardware and patch cords) used in the system for a minimum of (25) twenty-five years from the date of acceptance. Each component of the system shall be covered for defects in materials and workmanship. Copper links shall be warranted against the link performance minimum expected results defined in the TIA/EIA SP-2840A, Annex E. Fiber optic links shall be warranted against the link and segment performance minimum expected results defined in the TIA/EIA SP-2840A, Annex H. All fiber and copper cabling, termination components, and ancillary devices shall be of one manufacturer to insure no disputes can arise between different manufacturers if performance problems arise. Installers

shall be factory trained technicians with a factory trained supervisor overseeing the project.

2. Warranty scope includes, but is not limited to, network cables and terminations, network workstation plug-in outlets, and patch panel plug-in outlets, cable splices and connectors.
 3. Repair or replace the defective material at the project premise, to comply with the performance standards outlined in the contract documents during the warranty period.
 4. All newly installed fiber optic cabling and any existing fiber optic cabling which was disconnected/reconnect during the course of this project shall require complete link test in accordance with the testing requirements specified elsewhere in this document, and require an Commscope 25 year EWP warranty.
 5. In addition to the manufacturer warranties, the Contractor shall provide their own 2-year warranty covering all aspects of the project to include workmanship.
 6. Upon successful completion of the installation and subsequent inspection, the District's Project Manager shall be provided with a numbered certificate, from the manufacturing company, registering the installation.
 7. All conditions for obtaining the manufacturer's warranty shall be the sole responsibility of the contractor.
- C. The structured cabling system shall be a Commscope end-to-end solution. No equal. All equipment must be approved by District (Technology and Information Services).

1.12 QUALITY ASSURANCE

- A. Work shall be done by a qualified AMP ND&I Contractor holding licenses required by legally constituted authorities having jurisdiction over the work. Contractor shall have completed at least ten (10) projects of equal scope to systems described herein and shall have been engaged in business of supplying and installing specified type of systems for at least 5 years.
- B. Contractor shall warranty all work executed and materials furnished shall be free from defects of material and workmanship for a period of two (2) years from acceptance date of Contract Completion. Immediately upon receipt of written notice from the District, Contractor shall repair or replace at no expense to the District: Any defective material or work which may be discovered before final acceptance or work, or within warranty period; any material or work damaged thereby; and adjacent material or work which may be displaced in repair or replacement.
- C. Examination of or failure to examine work by the District shall not relieve Contractor from these obligations.
- D. If Contractor fails to repair or replace material or work indicated above within 7 days of receiving written notice, the District, with its own personnel or by Contract, may proceed with repair or replacement and assess cost against Contractor, if Contractor does not respond accordingly.
- E. Persons skilled in trade shall install system in accordance with best trade practice. Further, in accordance with all applicable building codes. Contractor and all contractors' employees terminating cable to wiring terminating devices shall be

certified by the manufacturer of the wiring device. Copies of certificates shall be provided to the District Representative prior to the start of work.

PART 2 - PRODUCTS

2.01 COPPER WIRE CABLE (TWISTED PAIRS)

- A. Provide enhanced category 6E (4 pair) UTP blue color cable from each system jack indicated on the drawings to each building IDF or MDF patch panel.
- B. Enhanced Category 6E UTP blue color cable shall be copper wire, individually insulated and color coded, with an overall non-conductive jacket. Cables shall be manufactured by Commscope.
- C. All cable installed underground shall be rated for that use.
- D. Provide ten foot service loop at the MDF/IDF location and three foot service loop at outlet location for each cable.
- E. Provide enhanced category 6E cable for Data, Voice, LCD projector, IP camera, wireless data access point.

2.02 PORTABLE CATEGORY 6 COPPER WIRE PATCH CABLE ASSEMBLY

- A. Provide Category 6 patch cable assembly with pre-molded boot for all system jacks (for data, VOIP, LCD projector, IP camera, Wireless data access point,), interconnecting electronic network equipment to electronic network outlets, interconnecting patch panel outlet patch locations with each other, interconnecting patch outlet to electronic equipment, and outlets location as indicated on drawings.
- B. Provide following type portable Category 6 copper wire patch cable assembly.
 - 1. Gray 4' Category 6 patch cable assembly for data and VOIP, Amp #219885-4 (Patch panel end). Provide 20% spare cables assembly.
 - 2. Gray 7' Category 6 patch cable assembly for data and VOIP, Amp #219885-7 (Patch panel end). Provide 20% spare cables assembly.
 - 3. Gray 8' Category 6 patch cable assembly for data and VOIP, Amp #219885-8 (work station location). Provide 85% of total work station patch cables assembly.
 - 4. Gray 15' Category 6 patch cord assembly for data and VOIP, Amp #1-219885-5 (work station location). Provide 15% of total work station patch cables assembly.
 - 5. Gray 4' Category 6 patch cable assembly for IP clocks, IP speakers and combination IP clock/speakers (at IDF location), Amp #219885-4. Provide 20% spare cables assembly.
 - 6. Blue 7' Category 6 patch cable assembly for IP clocks, IP speakers, and combination IP clock/speakers (at device location), AMP # 219886-7. Provide 20% spare cables assembly.

7. White 6' Category 6 patch cable assembly for LCD projector and IP camera, Amp #219889-6. Provide 50% spare cables assembly.
 - a. All patch cables assembly shall be in compliance with manufacturer's "Link" Warranty requirements.
 - b. Patch cables assembly shall be factory assembled with factory terminated plugs at each end. Field terminated patch cables assembly shall not be permitted. Terminated plug shall incorporate integral bending radius limiting molded "boots" and strain relief. Patch cables assembly shall be rated for "heavy duty" service.
 - c. Patch cables assembly shall comply with the same cable communication performance requirement as the cables and outlets.

2.03 VOICE DATA OUTLETS

- A. Twisted Pair Horizontal Cables: 4 pair, UTP, UL Level 6, type CMR or CMP, depending upon the environment in which the cables are placed, with performance characteristics that meet or exceed ANSI/EIA-568-C Category 6 requirements.
- B. Faceplate/Jacks: Coordinate color of faceplates and outlets with Division 16 electrical Sections and with existing outlets.
 1. Manufacturer: Commscope.

2.04 WIRELESS SYSTEMS

- A. Contractor shall provide mounting and data for wireless access as follows: All wireless equipment will be provided by the District, unless noted here or on the plans.
 1. For T-bar Ceiling mount below 10-feet: Provide flush deep 2-gang supported box with single mud ring mounted face down in the ceiling tile. Support in accordance with CBC requirements for equipment under 40 lbs.
 - a. Provide 3 Category 6e drops from IDF.
 - b. Provide 3 Category 6e 4-Pair Modular Receptacle
 - c. Provide face plate
- B. Contractor shall provide 2 wireless access point mounting locations per classroom located in opposite corners.
- C. Contractor shall provide 1 mounting location per non-classroom within 400 sq. ft. of another wireless access point mounting location.
- D. Wireless Equipment not listed here to be provided by GUHSD ETS.

PART 3 - EXECUTION

3.01 CABLE INSTALLATION

- A. Cables connecting to equipment racks shall be installed with not less than six feet of slack cable between the equipment rack/terminal block and terminal backboard. The slack cable shall be coiled and supported on the backboard and/or cable tray.

- B. Cables shall be trained, dressed and racked on the plywood backboards. Provide cable, metal support arms and re-enterable type cable support rings not less than 12 inches on center mounted onto the plywood along the entire length of all cables.
- C. No single cable run shall exceed 290 feet from patch panel to device without written direction from the District IS personnel.
- D. Provide 36 inches of cable slack at workstation outlets.
- E. Provide cables installed from individual computer/data workstation outlets to respective terminal closet/room equipment rack patch panel. Cables shall be continuous without cutting or splices.
- F. Minimum bending radius of fiber optic cables shall not be less than 12-inches. Maximum pulling tension shall not exceed 25 pounds. In no case shall the manufacturer's recommendations be violated.
- G. The minimum bending radius for copper wire cables shall be 10 times the cable outside diameter. The maximum pulling tension and minimum bending radius shall not violate manufacturer's recommendations.
- H. Cable lengths over 50 feet shall be machine pulled and not hand pulled. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum cable pulling speed shall be greater than 15 feet per minute.
- I. A dynamometer to measure pulling tension shall be used on all cable runs in excess 200 feet or with more than 180 degrees in bends. The actual pulling tension value shall be calculated and recorded for each pull. A written report will be provided to the District.
- J. The portions of cables installed without raceways or cable tray supports shall be installed with "j-hood" cable supports.
 - 1. The "J-hooks" shall provide multi-tiered "treed" "J" shared hooks, with wide flat cable support base (0.5"W minimum) and smooth rounded corners, specifically designed for Category-6 and fiber optic cable support. As manufactured by Erico Inc. or substitution of equal or better and approved by the District.
 - 2. The individual "J-hook" attachment to the building structure shall be "beam clamp", "hanger rod", clevis hanger styles.
 - 3. Install "J-hooks" not more than 36 inches on center along the entire cable length, at each cable change in direction, to insure less than 6 inches of cable sag between adjacent hooks. Secure cables to "J-hooks" with cable tie wraps. "J-hooks" supported cables, bundle cables together with tie wraps.
 - 4. "Bridle rings" shall not be used to support cables.
 - 5. Cables shall not rest directly on ceilings, ceiling hangers, lighting fixtures, air ducts, piping, or equipment.
- K. In each conduit to be used for fiber cable provide four (4) 1-inch innerduct with "Jack-moon" plugs.
- L. All copper horizontal cables shall be installed in the following manner:

1. Cable raceways shall not be filled greater than the CEC maximum fill for the particular raceway type.
2. Cables shall be installed in continuous lengths from origin to destination (no splices) unless specifically addressed in this document.
3. Cable splices are not allowed.
4. The cable's minimum bend radius of 4 times the cable diameter and maximum pulling tension of 25 lbs. shall not be exceeded.
5. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of four-foot intervals – at no point shall cable(s) rest on acoustic ceiling grids or panels.
6. Horizontal distribution cables shall be bundled in groups of not greater than 40 cables (cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle).
7. Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware.
8. The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
9. Cables shall not be attached to ceiling grid or lighting support wires.
10. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the District.
11. Cables shall be identified by a self-adhesive label in accordance with the District standards.
12. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
13. Unshielded twisted pair cable shall be installed so that there are no bends less than four times the cables outside diameter (4 X cable O.D.) at any point in the run.
14. Pulling tension on 4-pair UTP cables shall not exceed 25-pounds for a single cable or cable bundle.
15. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B document, manufacturer's recommendations, and/or best industry practices.
16. Pair untwist at the termination shall not exceed 0.25 inch for connecting hardware.
17. Cables shall be neatly bundled and dressed to their respective panels or blocks.
18. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
19. The cable jacket shall be maintained as close as possible to the termination point.

- 20. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties.
- M. Provide nylon pull strings with all cable runs, conduit stub ups, conduit sleeves, cable trays, open wiring routes, Innerduct, and spare. Pull strings shall be free from cable bundles in open wiring routes.
- N. Provide Velcro cable management straps on all copper cable bundles, the last 20 feet or upon entry into equipment closet, a maximum of 12" apart, on the rear of the equipment racks and on the patch cords within the vertical cable managers. Straps shall be a maximum of 12" apart.
- O. Provide protective bushings at the ends of all exposed conduits used for the data system cabling. This is to include all conduits installed for any future data cabling requirements.

3.02 HANDLING OF CABLE REELS

- A. Cable ends shall be sealed prior to shipment to prevent moisture entry into cable. Cable ends shall remain sealed at all times including during installation. Where ends seals are removed, reseal cable ends by stripping cable finishes back 2" down to insulation. Then apply four layers of an insulating tape crisscross over the cable end and carry back at least 4" onto cable outer finish. Add a containing cover of two layers of vinyl electrical tape completely over the end seal.
- B. Cable reels shall be shipped with factory applied lagging (protective cover) left in place until removal is absolutely necessary. Store reels of cable on a firm surface, paved, or on planking to prevent settling into soft ground.

3.03 CABLE TERMINATIONS

- A. General
 - 1. Computer/data workstation outlets connecting to ports in patch panels shall be grouped together in the patch panel by outlet, room location and building area location. Each group shall be identified with engraved (etched) nameplates indicating grouping identification and individual port numbers.
 - 2. Polarity and color coding of cable connections at splices, terminations and outlets shall be consistently maintained throughout the entire electronic network system.
 - 3. Terminate all cables onto respective outlets and terminals. Terminations shall comply with manufacturer's recommendations.
- B. Fiber Optic Terminations
 - 1. Individual fiber optic fibers shall each be terminated with a fiber optic fiber connector. The connector for each fiber shall be "plugged" into separate fiber optic fiber interconnection couplers on the rear of each respective outlet.
 - 2. Each fiber optic termination ferrule shall be inspected, after completion of the termination, visually with a fiber optic inspection microscope and an interferometer, to insure fiber "undercut", "protruding" fiber, over polish and

under polish of fiber termination ends does not exist in the finished termination ferrule.

3. Fiber optic cables terminated between two fiber optic patch panels located in separate equipment racks. The fibers shall be paired together for purposes of identification. Each pair of fibers shall be "plugged" into separate, physically adjacent fiber optic fiber interconnection couplers at each patch panel. The horizontal/vertical arrangement of paired patch panel fiber couplers shall match at both ends of the fiber cable.

C. Copper Wire Terminations

1. Unless specifically directed otherwise by the District's Representative, Pin assignment for wiring terminations shall comply with ANSI/EIA/TIA 568b.

3.04 CIRCUIT TERMINAL ROOMS AND CLOSETS

- A. Provide conductor/cable training and racking support distribution rings installed on backboards. Support rings shall be spaced a minimum of 10 inches on center along all cable/conductor routing paths on backboards and within 4 inches of each change in cable/conductor direction. As manufactured by Newton 3042 series, Saunders or equal with District approval.

3.05 LABELING AND IDENTIFICATION

- A. Fiber optic and copper wire cables shall be identified in each pull box, equipment rack and computer workstation outlet. Identification tags shall include the following information:

1. Installation month and date (i.e. 3/2011, 4/2012, etc.)
2. Conductor size conductor type (i.e. loose tube fiber; (#24 AWG UTP Category 3, 200 pair, telephone/voice etc.).
3. Tag type to match existing site condition.
4. Label the faceplate at the fiber optic tray to correspond to each cable terminated.

B. Additional Labeling:

1. Camera – CAM
2. Projector – AV

- C. Each cable run shall be permanently labeled at each end with a unique sequential number which corresponds to a similar number provided for each data outlet and punch down point. A printed label shall be placed at each of the following locations:

1. On cable at the rear of the patch panel or termination block, provide self-laminating wrap around label, Brady Label self-laminating 1.2" by 1.5" wrap around label #29689 or equal to match site condition.
2. On each cable in the j-box behind the faceplate location. Provide self-laminating wrap around label, Brady Label self-laminating 1.2" by 1.5" wrap around label #29689 or equal to match site condition.

3. On the faceplate of the patch panel, provide a ¾" by ¾" label with a letter or number identifying the patch panel designation.
 4. On the face of the faceplate in the label holder window.
- D. The labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
 - E. All label printing will be machine generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, approximately sized to the outside diameter of the cable, and placed within view at the termination point on each end. Outlet labels will be the manufacturer's label provided with the outlet assembly.
 - F. Hand written labels are not permitted. Where cable ID includes room number identification the contractor shall obtain written verification of actual room numbers from school site prior to beginning labeling (numbers on plans do not always match actual room numbers). Cable pulling cross reference lists will not be accepted with final documentation.
 - G. Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.
 - H. All faceplates shall be identified with permanent printed labels. Labels must not be subject to removal by incidental contact. Contractor shall be responsible for replacing defective labeling for a period of one year from date of final sign-off of project.
 - I. All fiber optic and UTP feed cables shall be identified with permanent, water resistant, printed labels at the fiber shelf. Labeling information shall include closet identifications, quantity of conductors (UTP) or strands of (fiber) and house pair designations (UTP).
 - J. Labeling shall follow recommended EIA/TIA standards and as requested by the School District to match site condition. Contractor shall confirm labeling pattern prior to final identification and testing. Labeling for new sites shall identify "**IDF# / Room# / outlet #**". All test results shall be identified by the final labeling scheme.
 - K. All fiber optic cables and/or innerduct shall be tagged with orange fiber optic warning tags in every manhole and/or pull box. Fiber warning tags shall also be placed at each end of the cable in the termination closets in clear view. A minimum of (3) tags are required at each end. Fiber warning tags shall be placed on fiber optic cable and/or innerduct routed through open ceiling environments at increments no less than 10 feet apart.

3.06 CABLE SYSTEM TESTING

- A. All cables and termination hardware shall be 100% tested for defects in installation to verify cable performance under installed conditions. All conductors of each installed cable shall be verified useable by the contractor prior to system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.

- B. Each copper cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair data cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. All category 6E cables shall be tested to ensure the category 6E standard performance to 500Mhz is complied with. All tests shall be printed out in hard copy in the quantity called out in the general specifications for O&M and turn over documents as well as one disc copy for the Districts use. All test reports shall be delivered to the District prior to project close out. Data cables shall be tested using a (Fluke – DSP 4000 series or equivalent) cable analyzer.
- C. Continuity
 - 1. Each pair of each installed cable shall be tested using a “green light” test set that shows opens, shorts, polarity and pair-reversals. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicted by the test set in accordance with the manufacturers recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
- D. Length
 - 1. Each installed cable shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in identification number and circuit or pair number. For multi-pair cables, the longest pair length shall be recorded as the length for the cable.
 - 2. Near End Cross-Talk (NEXT)
 - 3. Attenuation
 - 4. Ambient Noise
 - 5. Attenuation to Cross-Talk Ratio (ACR)
 - 6. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.
- E. Fiber
 - 1. All fiber terminations shall be visually inspected with a minimum 200 X microscope to ensure that no surface imperfections exist after final polishing. In addition, each fiber strand shall be tested for attenuation with an optical power meter and light source as well as an OTDR. Cable length and splice attenuation shall be verified using and OTDR.
- F. Attenuation
 - 1. Horizontal distribution multimode optical fiber attenuation shall be measured at either 850 manometers (nm) or 1300 nm using and LED light source and power meter. Backbone multimode fiber shall be tested at both 850 nm and 1300 nm in one direction. Test set-up and performance shall be conducted

in accordance with ANSI/EIA/TIA-526-14 Standard, Method B. One 2-meter patch cord shall be used for the test reference and two 2-meter patch cords shall be used for the actual test. This test method uses a one jumper reference, two jumper test to estimate the actual link loss of the installed cables plus the loss of two connectors. This measurement is consistent with the loss which network equipment will see under normal installation and use. Test evaluation for the panel to panel (backbone) or panel to outlet (horizontal) shall be based on the values set forth in the ANSI/TIA 568-C.3, Optical Fiber Link Performance Testing.

2. Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the District and the Contractor prior to the start of the test.
3. Test evaluation for the panel to panel (backbone) shall be based on the values set forth in the ANSI/TIA 568-C.3, Optical Fiber Link Performance Testing.

G. Length and Splice Loss

1. Each cable shall be tested with an Optical Time Domain Reflectometer (OTDR) to verify installed cable length and splice losses. The OTDR measurements for length shall be performed in accordance with EIA/TIA-455-60. The measurements to determine splice loss shall be performed in accordance with manufacturer's recommendations and best industry practices. These tests shall be employed on all cables after installation and in addition where one or more of the following conditions exist.
2. OTDR and power meter testing is specifically requested by the District.
3. Each strand shall be tested on all outside plant and tight-buffered cables.
4. A representative strand of each fiber cable shall be tested to verify length if the estimated cable length is within 10% of the maximum length specified, respective to cable function, in the ANSI/TIA 568-C Standard.

H. Test Documentation

1. Test documentation shall be provided in a three-ring binder(s) within three weeks after the completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs, Horizontal and Backbone. Each major heading shall be further sectioned by test type. Within the horizontal and backbone sections, scanner test results (Category 3, 4, or 5), fiber optic attenuation test results, OTDR traces, and green light test results shall be segregated by tab. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail

the test method used and the specific settings of the equipment during the test.

2. Scanner tests shall be printed on 8-1/2" x 11". Hand written test results (attenuation results and green light results) shall be documented on an Excel spreadsheet. OTDR test results shall be printed or attached and copied on 8-1/2" x 11" paper for inclusion in the test documentation binder. Provide spreadsheet on a CD
3. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall collocated in the binder.

3.07 RECORD DRAWINGS

- A. The installation contractor will be provided with two sets of drawings at the start of the project. One set will be designated for the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis, and will be available to the Technical representative upon request during the course of the project. Anticipated variations from the building drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by the District. Contractor shall also redraw, with AutoCAD version 2004 or newer, the site and floor plans showing all fiber, copper, racks, and information outlets as well as the labeling scheme for all items. These CAD drawings shall be on 8-1/2" x 11" sheets of paper and disk, and be turned over to the District with the O&M manuals.
- B. The Contractor shall provide the central drawing set to the District at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cable system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

3.08 FIRESTOP SYSTEMS

- A. A firestop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
- B. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
- C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (P.E., licensed in the state where the work is to be performed. A drawing showing the proposed firestopped system, stamped/embossed by the cognizant PE shall be provided to the District's Technical Representative prior to installing the firestop system.

- D. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.09 FIELD QUALITY CONTROL

- A. 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.
- B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminal are identified. Provide a list of final tap settings of paging speaker line matching transformers.
- C. Testing:
 - 1. Provide all instruments for testing and demonstrating in the presence of the District'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 District 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 and or all of the equipment on the basis of the results thereby obtained.

3.10 CLEANING AND PROTECTION

- A. 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.

3.11 WARRANTY

- A. 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 District.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the District after the end of the guarantee period.
- C. 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.

D. Manufacturer Warranty

1. The contractor shall facilitate a 25-year system performance warranty between the manufacturer and the District. An extended component warranty shall be provided which warrants functionality of all cabling and connectivity components used in the system for 25 years from the date of acceptance. The performance warranty shall warrant the installed horizontal copper and both the horizontal and the backbone optical fiber portions of the cabling system. Copper and fiber optic links shall be warranted to the link or channel performance as defined in ANSI/EIA-568-C.
2. Upon completion of the project, the customer's technical representative will perform a final inspection of the installed cabling system with the contractor's project foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the customer.
3. Upon receipt of the test documentation, the customer reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Customer testing will use the same method employed by the contractor, and minor variations shall be allowed to account for differences in test equipment and test variability. If significant discrepancies are found, the contractor will be notified for resolution.
4. During the three week period between final inspection and delivery of the test and as-built documentation, the customer will activate the cabling system. The customer will validate operation of the cabling system during this period.
5. Completion of the installation, in-progress and final inspections, receipt of the test, receipt of the as-built documentation, and successful performance of the system for a two week period will constitute acceptance of the system.

E. Special Warranty

1. The contractor shall warrant the cabling system against defects in workmanship for a period of one year from the date of system acceptance. The warranty shall cover all labor and materials necessary to correct a failed portion of the system and to demonstrate performance within the original installation specifications after repairs are accomplished. All warranty repairs shall be done within fourteen days from being notified in writing by the District. This warranty shall be provided at no additional cost to the District.

END OF SECTION

SECTION 27 41 16.51

CLASSROOM AUDIO-VISUAL SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK:

- A. The work under this section includes all labor, materials, equipment, and accessories required to furnish and install complete audio visual systems for the classrooms as shown on the plans.
- B. The systems shall provide the capability of switching between images from computers, DVD players, document cameras, or other A/V sources. The images will then be routed to the LCD Projector in the classroom for display on a screen. Audio associated with the images shall be switched simultaneously to an amplifier which feeds ceiling mounted loudspeakers located in the classroom.
- C. Announcements from the Public Address system shall interrupt the audio in the classroom system. When the PA announcement is complete, the classroom A-V system shall return to normal operation.

1.02 RELATED WORK:

- A. Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 01 and 26 of these specifications.
- B. 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.
- C. 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 one (1) year after final acceptance under this section shall be the responsibility of the communications contractor.
- D. 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 operation of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.

1.03 GENERAL REQUIREMENTS

- A. The Installing Communications Contractor shall hold a valid State of California C-10 License, shall have completed at least 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 District of performance and satisfactory service during the guarantee period.
- B. The Installing Communications Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work

- C. 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. The Contractor shall employ factory-trained technical/service personnel for service and maintenance of the system. Their resumes will be required. The factory-trained technical/service personnel shall have a minimum of five years experience installing the proposed system.
- D. The installing Communication Contractor shall have a design staff with a BICSI certified (RCDD) Registered Communications Distribution Designer. The installing Communication Contractor shall have a factory trained service department. The service department shall be on call 24 hours a day, 365 days a year, to arrive and initiate onsite service the specified equipment upon (24) hours notice.

1.04 DEFINITIONS

- A. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.

1.05 QUALITY ASSURANCE:

- A. In order to establish standards of performance the equipment specified shall be as manufactured by Extron.
- B. 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.
- C. All communication systems supplied shall be listed by Underwriters Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.
- D. Comply with CEC.

1.06 SUBMITTALS

- A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 26 of these specifications.
- B. 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 copies of a complete submission.
 - 2. The submission shall consist of four 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 Extron factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
5. The third section shall contain an original factory data sheet for every piece of equipment in the specifications.
6. The fourth section shall contain a wiring designation schedule for each circuit leaving each piece of equipment and drawings showing system wiring plans for a typical classroom.

PART 2 - PRODUCTS

2.01 AUDIO VISUAL SYSTEM

- A. Provide the following Audio/Visual, cabling, patch cords and raceways for complete operable Audio/Visual system in each classroom and in each room (itinerant rooms) as indicated on drawings.
- B. Outlets and faceplates as indicated on multi-media riser diagram. All face plate shall be white and shall include appropriate modular inserts to confirm with system requirements.
- C. Classrooms: Extron digital PVS407D PoleVault, ceiling mounting.
 1. PVS 407D Digital Switcher
 2. MLC 104 IP Plus MediaLink Controller
 3. PVT HDMI Input Wallplate
 4. WPD-01 Input Wallplate
 5. FF 120 Speakers
 6. PPS 35 Priority Page Sensor
 7. PCM 340 Drop Ceiling Mount
 8. PMK 560 Pole Mount Kit
 9. UPB 25 Projector Mount
 10. Cabling
 11. AverMedia AW313L Wireless Microphone
- D. Room Audio/Video Patch cables
- E. Projector:
 1. Hitachi Short Throw (Owner furnished, owner installed)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. 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.
- B. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

- C. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or nylon cable ties. All cables shall be numbered for identification.
- D. Splicing of conductors in underground pull boxes is not permitted.
- E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the District and architect to engage in the installation and service of this system.
- F. 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.

3.02 WARRANTY

- A. 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. The transmitter and receivers shall be warranted for parts and labor for a period of three (3) years by the manufacturer. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the District.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the District after the end of the guarantee period.
- C. 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.

3.03 TESTING

- A. Provide all instruments for testing and demonstrating in the presence of the District's inspector that the frequency response is 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
- B. The District 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.
- C. Check out and final connections to the system shall be made by a factory-trained technician in the employ of a manufacturer of the products installed. In addition, factory-trained technicians shall demonstrate operation of the complete system and each major component to the District.
- D. System field wiring diagrams shall be provided to the District by the system manufacturer prior to completion of the installation.
- E. Upon completion of the installation of the equipment, contractor shall provide to the District a signed statement from the equipment manufacturer that the system had been tested and functions properly according to the specifications.

- F. The contractor shall be responsible to provide service within 24 hours (or by mutual consent) after notification by the District or his representative, within the hours of 8:00 AM to 5:00 PM from Monday to Friday. Service request forms shall be supplied by the Contractor and the faxing or mailing of such request form shall constitute notification by the District of a service request.

3.04 TRAINING

- A. Contractor shall provide a minimum of 40 hours of on-site training for site staff on the Classroom video systems. Training for personnel shall be provided by certified technology specialists. The scope of training shall encompass system operation and procedures. Technician training should include an integrated information overview, media retrieval procedures as well as operation procedures for local control configurations. The contractor shall provide a detailed written outline clearly describing the proposed plan for all training, for approval by the Engineer and District's representative.
- B. Training for staff will include basic system concepts. Faculty and staff will need to know how to power on/off the system, and how to access one or more media resources via remote control. Training should include use and operation of audio/video devices and techniques and trouble-shooting tips. Trainers should incorporate hands-on techniques to maximize staff opportunity to incorporate and develop curriculum that is both meaningful and targeted for their student needs. Clearly written support materials should be provided to all training participants. Manual describing operation and use of the system shall also be provided.
- C. Contractor shall provide a minimum of 4 hours of on-site training for technicians.
- D. Trainers shall provide technicians with an in-depth technical overview of head end or control system concepts. Training should include basic overview of head end and local control and troubleshooting concepts. Head end training should include system concepts and hands on usage of media sources. Media center technicians will be trained to provide setup, operation and application of return video. Clearly written documentation and support materials must be provided for each installation. A training manual describing operation and use of the system shall also be provided. Provide control of local resources and will be equipped with the required local switching and control capability. Provide required cables to integrate all local room devices including Plasma displays, DVD/CR and audio I visual control system.

3.05 RECORD DRAWINGS

- A. The contractor shall maintain record drawings as specified in accordance with these specifications, and as noted below.
- B. Upon completion of the installation, four (4) copies of complete operational instructions shall be furnished, complete with record drawings. Instructions shall include part numbers and names, addresses, and telephone numbers of parts source. Final payment shall not be made until operational and maintenance manuals have been received.
- C. Drawings shall show locations of all concealed and exposed conduit runs, giving the number and size of conduit wires. Underground ducts shall be shown with cross section elevations and shall be dimensioned in relation to permanent structures to indicate their exact location. Drawing changes shall not be identified only with referencing CORs and RFIs, the drawings shall reflect all the actual changes made.
- D. One set of record drawings shall be delivered to the District in accordance with these specifications.

END OF SECTION

SECTION 27 51 00

INTEGRATED COMMUNICATIONS SYSTEM

PART 1 - GENERAL

1.1 SCOPE

- A. Provide complete expansion of existing Bogen Multicom 2000 Communications System to serve new construction. Upon completion of the project the integrated communications system shall be complete with all the capabilities of the latest Cajon Valley Unified School District requirement for integrated communications systems as noted in this specification. All provisions for a complete and operable system with interface to existing or new Telephone System shall be included under this scope of work. All Telephone Equipment including System Headend, Handsets and cabling are not part of this specification section.
 - 1. The Bogen authorized Contractor shall furnish all labor, materials, appliances, tools, equipment, facilities transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the applicable Contract Drawings and/or specified herein.
 - 2. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this Specification.

1.2 QUALIFICATIONS

A. Equipment

- 1. This specification is based on the equipment of manufacturer(s) who have been approved by the Owner and the Manufacturer(s) herein named shall be considered as meeting the requirements of this specification.
- 2. The equipment manufacturer shall be a United States manufacturer, who has been regularly engaged in the manufacture of communication systems for at least thirty (35) years.
- 3. Equipment provided for this project shall be the product of Bogen Communications, Inc., Engineered Systems Division. No substitutions shall be approved.
- 4. All equipment shall conform to applicable codes and ordinances.
- 5. All equipment shall bear the label of a Nationally Recognized Testing

Laboratory (NRTL) such as Intertek Testing Services NA, Inc. (ITSNA - formerly ETL) or Underwriters Laboratories Inc. (UL) and be listed by their re-examination service.

B. System Supplier/Installer

1. The system shall be provided and installed by the Manufacturer's Authorized Distributor who is trained and certified by the Manufacturer in the proper installation, programming, service and maintenance of the system.
2. Contact Bogen Communications, Inc., Engineered Systems Division (480) 892-7614 for the local authorized distributor.
3. The System Supplier/Installer shall hold a valid State of California Contractor's License, C-10.
4. The System Supplier/Installer shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection, service and maintenance of the system. The System Supplier/Installer shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.
5. The System Supplier/Installer shall be prepared to offer a service contract for the maintenance of the system beyond the warranty period.
6. The System Supplier/Installer shall be an established communications and electronics contractor that has and currently maintains a locally run and operated business for at least twenty (30) years.
7. The System Supplier/Installer shall perform the entire installation consisting of: wiring, device connection terminations, programming, inservices and warranty repair.
8. The System Supplier/Installer shall be a Low voltage systems Contractor, normally engaged in the business of sound reinforcement / intercom systems installation.
9. The System Supplier/Installer shall designate one person to act as the project manager having total responsibility for communications and project technical integrity. This project manager shall have a minimum of five (5) years experience as a supervisor and installer of the systems specified herein.

1.3 RELATED SPECIFICATIONS

- A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the Division 1 - General Requirements specifications are hereby made a part of this Section.

1. Basic Electrical Materials and Methods
2. Wiring Methods
3. Building Wire and Cable
4. Raceways and Boxes
5. Cabinets and Enclosures

B. RELATED WORK BY OTHERS

1. All conduits with pull cords, all electrical pull boxes, grounding rods, terminal cabinets, backboards and all outlet boxes shall be provided and installed by the Division 26 Contractor. Coordinate as necessary for proper installation. Specialty boxes shall be provided by the system Supplier/Installer and shall be installed by the Division 26 Contractor.
2. All 120VAC power conductors and conduits associated with power circuits to all low voltage system equipment locations shall be provided and installed by the Division 26 Contractor.
3. An insulated stranded copper ground wire shall be provided from each equipment rack to the building grounding system, in compliance with CEC Article 250, by the Division 26 Contractor.
4. Labeling of pullboxes and terminal cabinets shall be provided and installed by the Division 26 Contractor.

1.4 APPLICABLE CODES & STANDARDS

- A. Contractor to follow and adhere to most current and locally adopted codes and standards.
- B. Building Standards Administrative Code, Part 1, Title 24, California Code of Regulations
- C. California Building Code (CBC) Part 2, Title 24, California Code of Regulations

D. California Electrical Code (CEC) Part 3, Title 24, California Code of Regulations

E. California Fire Code (CFC) Part 9, Title 24, California Code of Regulations

1.5 SUBSTITUTIONS

A. No substitutions shall be approved.

1.6 SUBMITTALS

A. Within thirty-five (35) calendar days after the date of the award of the contract, the Contractor shall submit to the Architect for review, two (2) hard copies and one (1) electronic copy of a complete Submittal Package. The Submittal Package shall consist of the following sections, with each section separated with index tabs.

Title Page

Project Title

Project address

Architect's name and address

Contractor's name and address

Index of Submittal Contents

B. Each Section of the Submittal Package shall be numbered chronologically and shall be summarized in the Index.

Certifications

Index of Certification Section Contents

Valid State of California Contractors License

Manufacturer's Certifications

APPENDIX A: AUTHORIZED DISTRIBUTOR

APPENDIX B: FACTORY TRAINED TECHNICIAN

Project List

A substantial list (minimum of 20) of completed projects equal in scope to that specified herein.

APPENDIX C: CONTACT INFORMATION SHALL BE MADE AVAILABLE UPON REQUEST.

Product Data

Index of Equipment Data Sheets

Manufacturer's Data Sheets including cable types

APPENDIX D: APPLICABLE LISTINGS AND APPROVALS

PART 2 - - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The Integrated Communications System shall provide a comprehensive communication network between administrative and staff locations. The central processor and switching unit shall be of modular plug-in printed circuit board type, using HMOS microprocessor and TTL logic and HCMOS memory and sensing. HCMOS circuitry shall be protected with transient voltage surge suppression devices on all inputs and outputs. Non-volatile EPROM shall store permanent memory and non-volatile EEPROM shall store field-programmable memory. Systems, which use a battery to maintain system configuration information, shall not be acceptable.
- B. The system is to be designed and configured for maximum ease of service and repair. All major components of the system shall be designed as a standard component of one type of card cage. All internal connections of the system shall be with factory-keyed plugs designed for fault-free connection. The printed circuit card of the card cage shall be silk screened to indicate the location of each connection.
- C. Plug disconnect: All major equipment components shall be fully pluggable by means of multi-pin receptacles and matching plugs to provide for ease of maintenance and service.

2.2 ACCEPTABLE MANUFACTURERS

- A. The equipment model numbers specified herein are that of the **Bogen**

Communications, Inc., Ramsey, New Jersey.

- B. The intent is to establish a standard of quality, function and features. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications.
- C. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.3 SECTION INCLUDES

- A. Integrated Communications System for School Application
 - 1. Intercom System - Two way communication between any administrative phone and any classroom speaker.

Call initiation switches.

- 2. Classroom telephones.
- 3. Public Address System
- 4. Master Clock functionality with bell schedules and timed events.
- 5. Public automated building exchange system (Passing Bells)

2.4 SYSTEM SOFTWARE PARAMETERS

- A. The communication system shall be a Bogen Quantum Multicom IP, and shall provide a comprehensive communication network between administrative areas and staff locations throughout the facility. Nonvolatile memory shall store permanent memory and field-programmable memory. A system, which uses a battery to maintain system configuration information, shall not be acceptable. The system shall provide no less than the following features and functions:
 - 1. Telephonic communication (complete with DTMF signaling, dial tone, ringing and busy signals, and data display) on administrative stations shall use two wires. Systems that use more than two wires for communication, tones and data display shall not be acceptable.
 - 2. Amplified-voice communication with loudspeakers shall use a shielded audio pair (shield can be used as one of the two required conductors for administrative phone or call-in switch).

3. The system shall be available in the following configurations:
 - a. QCR Wall mounted in a custom enclosure. Station capacity shall be from 24 to 48 stations. All stations shall have the ability to support displays.
 - b. QSR Rack mounted in a custom enclosure. Station capacity shall be from 24 to 240 stations. All telephone stations shall have the ability to support displays.
 - c. 2223/2233 MC2KR Rack-mounted and integrated with Bogen Multi-Graphic Series 2223 or Series 2233 equipment. In this configuration, Quantum Multicom IP system station capacity shall be expandable up to 240 stations in increments of 24. All telephone stations shall have the ability to support displays. The Multi-Graphic system equipment provides the following: backup fail safe intercom and paging functions (Note: the systems operate independently; if one were to fail, the other provides intercom for student safety), plus two additional program channels, and additional Multi-Graphic functions. It shall be possible, by use of a separate call-in switch, to annunciate only to the Multi-Graphic portion of the system without using additional station ports within the Quantum Multicom IP system.

APPENDIX E: THE ABOVE SYSTEM CONFIGURATIONS REPRESENT A SINGLE PROCESSOR IN THE QUANTUM MULTICOM IP. EACH PROCESSOR CAN BE COMBINED WITH UP TO 63 ADDITIONAL SYSTEMS (NODES) FOR A TOTAL SINGLE FACILITY CAPACITY OF UP TO 16,000 STATIONS. UP TO 99 ADDITIONAL FACILITIES CAN COMMUNICATE WITH EACH OTHER TO PROVIDE DISTRICT-WIDE POINT-TO-POINT CALLING AND ALL-CALL PAGING WITH UP TO 1,600,000 STATIONS.

4. All new devices must be capable of supporting existing Multicom 2000 hardware and functions as well as the features across the Quantum Processor's interfaced over the LAN.
5. The system shall consist of any combination of the following: Administrative Display Phones, Administrative VoIP Phones, and Administrative Phones.
 - a. Staff Classroom Stations shall consist of ceiling-mounted loudspeakers with call-in switches.
 - b. Administrative phone stations shall consist of MCS54 phones.
 - c. Administrative Display Phones shall be DTMF-dialing digital telephone sets with a 4x16 character LCD display panel. They shall be equipped with a standard 12-key push-button dialing keypad. Phones requiring external LCD displays shall not be accepted as an equal. Optionally, a loudspeaker may be connected at each administrative station location.

APPENDIX F: UP TO 5 ADMINISTRATIVE WALL DISPLAYS MAY BE ADDED TO THE ADMINISTRATIVE STATION FOR LARGE OFFICE AREAS.

- d. Administrative Display Phones and Administrative Phones shall have the option of including a loudspeaker.
 - e. All types of stations except administrative VoIP phones shall utilize the same type of field wiring. Future station alterations shall only require the station type to be changed and the proper software designation to be selected. Alterations shall not require field wiring or system head-end alterations. All field wiring and system head-end equipment shall support any type of station, at the time of installation. All contractor proposals shall reflect this capacity. Failure to submit and bid this project in this manner will be deemed as being in direct conflict of these specifications and will be rejected.
6. It is of utmost importance that emergency calls from staff stations receive prompt attention. Therefore, it is important that there be an alternate destination in case the emergency call does not get answered at the primary location. To this end:
- a. Staff-generated Emergency calls shall be treated as the second highest system priority. Therefore, all Emergency calls shall announce at the top of the call queue of their respective administrative telephone(s). Should that emergency call go unanswered for 15 seconds, the call shall be re-routed to an alternate speaker station then prompt the caller to make a verbal call for help. During the transfer, the original administrative telephone shall continue to ring the distinctive Emergency Ring. Should the Emergency Transfer to Station have an associated administrative telephone, it too shall ring the distinctive Emergency ring.
 - b. Each staff call station shall be programmable for one of three call-in types, as follows:
 - 1) Normal / Emergency
 - 2) Urgent / Emergency
 - 3) Emergency

APPENDIX G: STAFF CALL STATIONS PROGRAMMED FOR ACCESS NORMAL / EMERGENCY OR URGENT / EMERGENCY SHALL BE ABLE TO INITIATE AN EMERGENCY CALL BY REPEATED FLASHING OF THE HOOK SWITCH OR REPEATED PRESSING OF THE CALL-IN SWITCH. SYSTEMS, WHICH REQUIRE ADDITIONAL SWITCHES AND/OR CONDUCTORS TO INITIATE AN EMERGENCY CALL, SHALL NOT BE ACCEPTABLE.

APPENDIX H: EMERGENCY CALLS FROM ADMINISTRATIVE VOIP PHONES, ADMINISTRATIVE PHONES OR STAFF CALL SWITCH STATIONS SHALL INTERRUPT A NON-EMERGENCY CALL IN PROGRESS AT THE DESIGNATED ADMINISTRATIVE DISPLAY PHONE.

THE ADMINISTRATOR SHALL RECEIVE A WARNING TONE AND BE CONNECTED TO THE EMERGENCY CALLER. THE DISCONNECTED PARTY SHALL RECEIVE A BUSY SIGNAL. SYSTEMS WHICH DO NOT PROVIDE EMERGENCY CALL INTERRUPT SHALL NOT BE ACCEPTABLE.

APPENDIX I: IT SHALL BE POSSIBLE TO CONNECT A SINGLE PUSH EMERGENCY CALL-IN SWITCH TO ANY ADMINISTRATIVE VOIP PHONE OR ADMINISTRATIVE PHONE, WITHOUT EFFECTING NORMAL STATION OPERATION.

APPENDIX J: NORMAL AND URGENT CALLS SHALL BE LOGGED INTO QUEUE FOR THE DESIGNATED ADMINISTRATIVE DISPLAY PHONES.

APPENDIX K: ADMINISTRATIVE DISPLAY PHONES SHALL RING FOR A PERIOD OF 45 SECONDS WHEN THEY RECEIVE A CALL, AND THEN STOP RINGING.

APPENDIX L: EACH QUEUE SHALL FIRST BE SORTED ACCORDING TO CALL PRIORITY (EMERGENCY CALLS, THEN URGENT CALLS, AND THEN NORMAL CALLS). CALLS ARE SORTED WITHIN EACH PRIORITY LEVEL ON A FIRST-IN, FIRST-OUT BASIS. WHEN A CALL IS ANSWERED, IT SHALL AUTOMATICALLY BE REMOVED FROM THE QUEUE. SYSTEMS, WHICH DO NOT SORT CALLS ACCORDING TO PRIORITY AND ORDER RECEIVED, SHALL NOT BE ACCEPTABLE. 1) THE DISPLAY SHALL SIMULTANEOUSLY SHOW UP TO FOUR (4) STAFF CALL SWITCH STATION CALLS PENDING. ADDITIONAL CALLS, BEYOND FOUR (4), SHALL BE INDICATED BY AN ARROW POINTING DOWN THUS PROMPTING THE USER THAT ADDITIONAL CALLS ARE WAITING.

APPENDIX M: IT SHALL BE POSSIBLE TO ANSWER ANY INCOMING CALL SIMPLY BY PICKING UP THE HANDSET WHILE IT IS RINGING. IT SHALL NOT BE NECESSARY TO HIT ANY BUTTONS TO ANSWER A CALL UNLESS THE CALL HAS DROPPED INTO THE QUEUE.

Administrative Display Phones shall be equipped with a 4x16 character alphanumeric display panel.

Administrative Display Phones shall receive dial tone upon going off-hook. Outgoing calls are made by dialing the desired stations. Incoming calls can be directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be an automatic switchover from loudspeaker to private telephone communication should the person pick up his handset.

The display shall normally show the time of day and day of week, the current time signaling schedule, and the numbers of up to four stations calling in along with the call-in status of each station (normal, urgent, emergency). When dialing from the Administrative Display Phone, the display shall indicate the station number and type of station (loudspeaker or handset) being dialed.

The display shall also provide user-friendly menu selections to assist the operator when paging and distributing program material. Displays shall be in English with internationally recognized symbols for maximum ease of use. Systems, which require the operator to memorize long lists of operating symbols or control codes, shall not be acceptable.

Administrative Display Phones shall be programmable for one of 3 station types for system access, as follows:

APPENDIX N: SHALL PERMIT DIALING ANY STATION IN THE SYSTEM; TURN PROGRAM MATERIAL ON/OFF AT THEIR LOCATION; SCROLL, ERASE AND AUTO-DIAL CALL-WAITING QUEUE; MAKE CONFERENCE CALLS AND TRANSFER CALLS; CALL FORWARD TO OTHER ADMINISTRATIVE STATIONS; MAKE ALL-ZONE PAGES AND EMERGENCY ALL-ZONE PAGES; HAVE ACCESS TO OUTSIDE LINES AND BE DESIGNATED TO RECEIVE OUTSIDE LINE CALLS.

APPENDIX O: SELECT AND DISTRIBUTE OR CANCEL PROGRAM MATERIAL TO ANY COMBINATION OF STATIONS, PAGING ZONES, OR ALL ZONES; SET/RESET ALARM/EXTERNAL FUNCTIONS AND ZONE PAGING.

APPENDIX P: BUMP OR JOIN A CONVERSATION IN PROGRESS, MANUALLY INITIATE TIME TONES.

Program selection, and its distribution or cancellation shall be accomplished from a designated administrative display telephone, with the assistance of the menu display system. Distribution and cancellation shall be to any one, or combination of speakers, or any zone(s), or all zones. It shall be possible to provide three program channels at the same time.

It shall be possible, via an Administrative Display telephone, to manually initiate any of eight (8) tones or any of the emergency tones. The tones shall be separate and distinctly different from the emergency tones. The tone selected shall continue to sound until it is canceled, or until the administrative display phone is placed back on-hook.

Each Administrative Phone shall maintain a unique queue of all stations calling that particular phone.

System programming shall be from an authorized Quantum Commander User via Web browser. All system programming data shall be stored in nonvolatile memory. A valid password shall be required to gain access to the following programmable functions:

Station Initialization shall be accomplished from an authorized Quantum Commander User via web browser. All station initialization data shall be stored in nonvolatile memory. A password (separate from the password necessary for system programming) shall be required to gain access to the following station initialization parameters:

APPENDIX Q: PROGRAMMING AND DIAGNOSTICS SHALL BE BUILT INTO THE QUANTUM COMMANDER WEB SERVER BROWSER AND BE ACCESSIBLE ONLY BY AUTHORIZED PERSONNEL. DIAGNOSTICS SHALL INDICATE PASSES AND FAILURES OF SYSTEM MEMORY, SYSTEM CLOCK, ALL AUDIO BUSES, TONE GENERATORS, DTMF GENERATORS AND DECODERS AND THE INTEGRITY OF THE FIELD WIRING.

APPENDIX R: THE DIAGNOSTICS FEATURE SHALL BE THE QUANTUM COMMANDER. IT SHALL BE POSSIBLE TO INDIVIDUALLY SELECT THE TEST AND CARD, OR ALL TO RUN DIAGNOSTICS ON. THIS SHALL BE A STANDARD FEATURE OF THE SYSTEM AND SUPPLIED AT THE TIME OF INSTALLATION. IT SHALL BE ACCESSIBLE ONLY BY AUTHORIZED STATIONS AND PERSONNEL.

APPENDIX S: SYSTEMS NOT CAPABLE OF SUPPORTING WEB-BASED DIAGNOSTICS AND ANY COMPUTER INTERFACE FOR PROGRAMMING AND DIAGNOSTICS, NOR SUPPORTIVE OF BUILT-IN DIAGNOSTICS FOR THE END USER SHALL NOT BE DEEMED AS EQUAL.

Rollover EOL (End-Of-Line Device)

*This feature shall be supported for all the Stations (Staff/Enhanced/Admin/SIP) configured with a loudspeaker. Based on the dialed sequence, (*xxx, xxx) the call will be connected to the corresponding station/speaker. If the speaker/station is busy, the call is rolled over to the station/speaker corresponding to that station.*

If a handset station, configured with this feature, is busy when an Admin User calls the station, the call shall be rolled over to the associated speaker. If the speaker is also busy in this case, then the Admin call can bump the conversation.

Rollover End-of-Line features not applicable with the Station with Call Switch or Station without the speaker.

For calls initiated by a call switch or a non-dial handset, rollover to the admin speaker shall not happen.

Admin AAA Group (Always An Answer)

This is an Administrative Phone feature. This feature shall be programmed from the Bogen Commander. A maximum of 10 Admin Phones will be supported in an Admin Group and there shall be a maximum of 32 Admin Groups per facility.

Once the Admin Group is set:

APPENDIX T: FOR NORMAL CALLS, IF THE PRIMARY DAY/NIGHT ADMIN PHONE IS BUSY/NO ANSWER, ALL THE PHONES IN THE ADMIN GROUP SHALL RING.

APPENDIX U: FOR EMERGENCY CALLS, IF THE PRIMARY DAY/NIGHT PHONE DOES NOT ANSWER, ALL THE PHONES IN THE ADMIN GROUP SHALL RING.

APPENDIX V: ON NO ANSWER FROM ANY OF THE ADMIN PHONES AND IF THE EMERGENCY ANNOUNCE LINK IS CONFIGURED, THE CALL SHALL BE TRANSFERRED TO THE EMERGENCY ANNOUNCE LINK AS PER THE EXISTING PROCEDURES.

APPENDIX W: ON ANSWER FROM ANY OF THE ADMIN PHONES, ALL THE OTHER PHONES SHALL STOP RINGING.

2.5 SYSTEM REQUIREMENTS

A. The Integrated Communications System shall be a **Bogen Quantum Multicom IP**

B. The system shall provide no less than the following features and functions:

1. The system shall be available in the following configuration:

a. Rack mount.

1) Single rack (node) capacity from 24 to 240 stations per node, 64 nodes per facility equaling a total of 16,000 stations per site, 100 site capacity.

2) All telephone stations shall have the ability to support displays.

b. The system shall consist of any combination of Administrative, Staff and Enhanced Staff Stations.

1) A minimum of one (1) Administrative Telephone required per system.

2) The maximum number of Administrative Telephones with displays shall only be limited by the Station capacity of the system.

APPENDIX X: SYSTEMS THAT LIMIT THE QUANTITY OF EACH TYPE OF STATION OR REQUIRE REWIRING OR ADDITIONAL EQUIPMENT AND/OR SYSTEM EXPANSION TO PROVIDE ADDITIONAL ADMINISTRATIVE TELEPHONES SHALL NOT BE ACCEPTED AS EQUAL.

c. Administrative Stations

APPENDIX Y: DTMF DIALING TELEPHONE SETS WITH A FOUR (4) LINE BY 16-CHARACTER LCD DISPLAY PANEL.

APPENDIX Z: STANDARD 12 KEY PUSHBUTTON DIALING KEYPAD

APPENDIX AA: LOUDSPEAKER MAY BE CONNECTED AT EACH LOCATION

APPENDIX BB: OPTIONAL LOUDSPEAKER MAY BE INCLUDED

APPENDIX CC: MEMBRANE-TYPE KEYPADS SHALL NOT BE ACCEPTED AS EQUAL

APPENDIX DD: SPECIAL FUNCTION KEYS TO PERFORM COMMON FUNCTIONS SHALL NOT BE ACCEPTED AS EQUAL

d. Staff Station

APPENDIX EE: WALL OR CEILING MOUNT LOUDSPEAKER WITH CALL-IN SWITCH

e. Enhanced Staff Station

APPENDIX FF: DTMF DIALING TELEPHONE SETS CONNECTED TO THE PBX OR EKSU

APPENDIX GG: SYSTEMS THAT REQUIRE TELEPHONES TO BE CONNECTED TO THE INTERCOM SYSTEM SHALL NOT BE ACCEPTABLE

APPENDIX HH: OPTIONAL LOUDSPEAKER MAY BE INCLUDED

All Station types shall utilize the same field wiring

APPENDIX II: FUTURE STATION ALTERATIONS SHALL REQUIRE STATION TYPE CHANGE ONLY, NOT FIELD WIRING OR HEAD-END ALTERATIONS. ALL FIELD AND SYSTEM HEAD-END EQUIPMENT SHALL SUPPORT ANY TYPE OF STATION, AT THE TIME OF INSTALLATION. ALL PROPOSED SUBSTITUTIONS SHALL REFLECT THIS CAPACITY. **FAILURE TO SUBMIT OR BID THIS PROJECT IN COMPLIANCE WITH THIS FEATURE WILL BE IN DIRECT CONFLICT OF THIS SPECIFICATION AND WILL BE REJECTED.**

The system shall be capable of providing up to four (4) simultaneously amplified-voice intercom paths. One amplified intercom path shall automatically be provided with each increment of 24 stations of system capacity.

All hardware, etc. required to achieve the maximum number of amplified-voice intercom channels for this system shall be included in this submittal.

2.6 SYSTEM COMPONENTS

A. CONSOLE

1. Provide hardware and amplifier for connection to new devices.

2. Power Amplifiers
3. HTA-125A-125 watt

B. PERIPHERAL DEVICES

ADMINISTRATIVE DISPLAY PHONE MCDS4

Administrative display phones shall be Bogen Model MCDS4. The administrative telephone display panel shows the time of day and day of week, the current time signaling schedule, and the station numbers and call-in priority of staff stations that have called that particular administrative station. A 2-key response is used to scroll the display, and answer or erase normal and urgent calls. Depending upon the system access level, an administrative station can use display menus to activate zone pages, alarm signals and external functions, as well as select program sources and distribute or cancel a program to any or all speakers or zones.

APPENDIX JJ: ADMINISTRATIVE STATIONS HAVE THE OPTION OF DIALING EITHER THE LOUDSPEAKER OR PHONE AT EACH STATION LOCATION. AN AUTOMATIC SWITCH FROM PHONE-TO-INTERCOM TO PHONE-TO-PHONE COMMUNICATION IS MADE WHEN THE STAFF HANDSET IS LIFTED.

APPENDIX KK: A BUILT-IN PROGRAM CLOCK, WITH BATTERY BACK UP, IS INCLUDED TO AUTOMATICALLY CONTROL CLASS CHANGE OR OTHER SIGNALS. THE CLOCK MAY BE SYNCHRONIZED WITH A MASTER CLOCK. 1024 EVENTS MAY BE PROGRAMMED INTO THE SYSTEM'S EIGHT TIME SIGNALING SCHEDULES.

SPEAKERS AND CLASSROOM CALL SWITCHES

Interior speakers ceiling mounted shall be Bogen S86T725PG8W with Lowell P8756 back box and SS24 tile support rails. Speaker grille shall be Lowell JG86

Drop In speakers shall be Bogen CSD2X2

Exterior speakers shall be Bogen FMH15T with Bogen SGHD8 Grille and FMHAR8 adapter kit. Speaker back box shall be Bogen BBFM6 for flush mount applications and Bogen BBSM6 for surface mount applications.

Classroom Call Switches shall be installed in locations as indicated on the drawings. Call Switches shall be Bogen CA15C.

All speaker cables shall be individually homerun back to the main intercom backboard. Speaker cable shall be West Penn 290 or equal by Belden

Wiring shall be done per manufacturer's recommendation

All #22AWG connections throughout the system shall be made by spring tension clip “punch block”, Siemons type 66 terminals or equal. Conductors #20AWG and larger shall be terminated on barrier screw terminals.

All communication system cable/wire shall be labeled at all points of termination. All labeling shall be based on the room numbers as provided by the Owner or his representative.

2.7 AUXILIARY SYSTEMS

A. CLOCK SYSTEM

1. Wireless Analog Classroom clocks shall be round, battery operation, surface mount type to match school site. All clocks shall be exclusively manufactured by Innovation Wireless to match existing standards throughout the school district.
2. All wireless clocks will act as a repeater and a transmitter.
3. All wireless clocks will be interfaced with the Innovation Wireless transmitter and utilize Network Time Server for synchronization of bell and clocks.

2.8 WIRE AND CABLE

- A. All wire and cables shall be new and unused. All wire and cable shall be enclosed in conduit unless otherwise noted. Wire not installed in equipment racks, not portable, or not installed in conduit shall meet all applicable codes.
- B. Indoor dry location Speaker and Call Button

West Penn 290 or approved equal

APPENDIX LL: 22/4 CONDUCTOR CABLE, (1) PAIR SHIELDED (1) PAIR UNSHIELDED, CMR RATED, NON-PLENUM, COMPLETE WITH PVC JACKET.

Outdoor wet location (cable pairs to be sized as required for 15% spare capacity) and will include cables pairs for both speakers and classroom call switches.

Tappan Cable Model No. 2250BT15/CMR/WB or approved equal

APPENDIX MM: 22/15 PAIR – INDIVIDUAL SHIELDED PAIRS CABLE, CMR/WB RATED, COMPLETE WITH BLACK UNDERGROUND/DIRECT BURIAL, SUNLIGHT RESISTANT RATED PVC JACKET

Tappan Cable Model No. 2250BT8/CMR/WB or approved equal

APPENDIX NN: 22/8 PAIR – INDIVIDUAL SHIELDED PAIRS CABLE, CMR/WB RATED, COMPLETE WITH BLACK UNDERGROUND/DIRECT BURIAL, SUNLIGHT RESISTANT RATED PVC JACKET

Protection

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

The contractor shall note in his system drawings, the type and location of these protection devices as well as all wiring information. Such devices are not to be installed above the ceiling.

2.9 TERMINAL CABINETS & JUNCTION BOXES

- A. All terminal cabinet and junction boxes are to be provided and installed by the Division 16 Prime Contractor. This contractor and the prime contractor shall coordinate mounting locations prior to install.

PART 3 - - EXECUTION

3.1 DIVISION OF WORK

- A. While all work included under this specification is the complete responsibility of the contractor, the division of actual work listed following shall occur.
 - 1. All conduits with pull cords, all electrical pull boxes, grounding rods, all outlet boxes, terminal cabinets, backboards, etc., which form part of the rough-in work shall be provided and installed completely by the Division 26 Contractor. Coordinate as necessary for proper installation.
 - 2. The balance of the system, including installation of initiating devices, notification appliances and equipment, making all connections, etc., shall be performed by the System Supplier/Installer.
 - 3. All 120VAC power conductors and conduits associated with power circuits to all low voltage system equipment locations shall be provided and installed by the Division 26 Contractor.
 - 4. An insulated stranded copper ground wire shall be provided from each equipment rack to the building grounding system, in compliance with CEC Article 250, by the Division 26 Contractor.
 - 5. Labeling of pullboxes and terminal cabinets shall be provided and installed

by the Division 26 Contractor.

3.2 INSTALLATION

- A. All work shall be completed in strict accordance with all applicable codes and ordinances, by a qualified Manufacturer's Authorized Distributor.
- B. Cable/Wire
 - 1. All cable/wire for the communications system shall be new.
 - 2. System cable/wire and equipment installation shall be in accordance with good engineering practices as established by the Electronics Industries Alliance (EIA) and the California Electrical Code (CEC). Wiring shall meet all applicable electrical codes. All cable/wire shall test free from all grounds and shorts.
 - 3. All #22AWG and #24AWG connections throughout the system shall be made by spring tension clip "punch block", Siemon type 66 terminals or equal. Conductors #20AWG and larger shall be terminated on barrier screw terminals.
 - 4. All communication system cable/wire shall be labeled at all points of termination. All labeling shall be based on the room numbers as provided by the Owner or his representative.
 - 5. Protection and dressing of cables:
 - a. Cables mounted on backboards and within equipment racks, etc., shall be grouped and securely attached to the backboard or enclosure in horizontal and vertical bundles in a neat workmanlike manner using Thomas & Betts "Ty-Rap", Panduit cable mounts and Allen-Tel cable management or equal. Edge protection material ("cat-track") shall be installed on edges of holes, lips of ducts or any other point where cables or harnesses cross metallic edge.
 - 6. Shielding:
 - a. Cable shielding shall be connected to common ground at point of lowest audio level and shall be free from ground at any other point. Cable shields shall be terminated in same manner as conductors.
 - 7. Underground cables

- a. Any cable/wire pulled through manholes or pullboxes located below grade shall be continuous with no splices. The cable/wire shall be intact with no cuts in the protective outer jacket.
- b. Provide 15% spare pair capacity for multi-pair cabling to each building.

C. Cable/Wire Terminations

All splices in above ground junction boxes shall be made on terminal strips.

3.3 SYSTEM START-UP

- A. All start-up programming and system commissioning shall be performed by a manufacturer's trained and certified technician.

3.4 SYSTEM VERIFICATION

- A. Subsequent to system start-up the system installer shall, at a minimum, verify that the following features are functioning properly.
 1. Two way talk-back
 2. All call paging
 3. Emergency call-in, if applicable
 4. Call switches, if applicable
 5. Verification of call station identifications with room numbers provided by the Owner or his representative.

3.5 ACCEPTANCE TESTING

- A. The system installer shall, in the presence of the Inspector of Record (IOR), perform 100% testing as noted in System Verification above.

3.6 DOCUMENTATION

- A. Provide the following directly to the Supervisor of Technology Service.
 1. Provide a printed copy of all field programming for all components in system.

2. Provide one copy of all diagnostic software with copy of field program for each unit.
3. Provide one copy of all service manuals, parts list, and internal wiring diagrams of each component of system.
4. Provide one copy of all field wiring runs, location and end designation of system.

3.7 MANUFACTURER'S FIELD SERVICES

- A. The contractor shall, at the owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.
- B. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

3.8 IN SERVICE TRAINING

- A. Provide complete "in service" instructions of system operation to school personnel. Assist in programming of telephone system.
- B. The Contractor shall instruct personnel designated by the Owner in the proper use, basic care and maintenance of the system beyond the warranty period.
- C. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training.

3.9 FACTORY TRAINING & CERTIFICATION

- A. The manufacturer shall provide factory certified training to two (2) technicians employed by the school district. These technicians shall be trained and certified as manufacturers certified technicians capable of performing any work on the system after the installation of the system.
- B. All cost for training including travel, lodging, meals and per diem shall be included in the installing contractors base bid price for this section.

3.10 GUARANTEE AND WARRANTY

- A. Guarantee all parts, labor, and workmanship furnished under this contract for the minimum period of twelve months from the date of substantial completion, or first

formal use by the Owner, whichever is last to occur. During the warranty period, report to the site and repair or replace any defective materials or workmanship without cost to the Owner. Non-emergency Warranty service shall be rendered within 24 hours after request by the Owner. Emergency service shall be provided within 8 hours of request by owner. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made. Where warranties on individual pieces of equipment exceed twelve months, the guarantee period shall be extended to the warranty period of the particular items.

- B. After completion of the work the Contractor shall submit a Certificate of Warranty, stating start-up and expiration dates and conditions of the warranty, for signature of both participating parties. Incremental warranties for completed portions of the work may be negotiated at the discretion of the Owner, if delays occur beyond the control of the Contractor.

3.11 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

- A. All work described herein to be done by the manufacturer's authorized representative shall be provided by a documented factory authorized representative of the basic line of equipment to be utilized.
- B. As further qualification for bidding and participating in the work under this specification the manufacturer's representative shall hold a valid C-10 Contractor's License issued by the Contractor's State License Board of California. The manufacturer's representative shall have completed at least ten (20) projects of equal scope, giving satisfactory performance and have been in the business of furnishing and installing sound systems of this type for at least five (5) years. The manufacturer's representative shall be capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.
- C. The manufacturer's representative shall provide a letter with submittals from the manufacturer of all major equipment stating that the manufacturer's representative is an authorized distributor. This letter shall also state the manufacturer guarantees service performance for the life of the equipment, and that there will always be an authorized distributor assigned to service the area in which the system has been installed.
- D. The contractor shall furnish a letter from the manufacturer of the equipment, which certifies that the equipment has been installed according to factory intended practices, that all the components used in the system are compatible and that all new portions of the systems are operating satisfactorily. Further, the contractor shall furnish a written unconditional guarantee, guaranteeing all parts and all labor for a period of one (1) year after final acceptance of the project by the owner.

END OF SECTION

SECTION 27 51 26

ASSISTIVE LISTENING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Provide Assistive Listening System per CBC requirements.
- B. The minimum number of receivers shall be equal to 4% of the seating, but not less than two.
- C. Systems shall be permanently installed in areas with permanent seating for 50 or more occupants or where a public address system is installed.

1.3 DEFINITIONS

- A. CBC: California Building Code (CCR Title 24 Part 2)
- B. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.

1.4 SUBMITTALS

- A. Product Data
 - 1. Product technical information sheets for each principal component in the proposed system. Identify by arrow, circle or similar means products being proposed. Submittals consisting of unmodified catalog pages with no markings will be rejected.
- B. Operation and Maintenance (O&M) Manuals: Furnish composite "Systems Operation and Maintenance" manuals in indexed three-ring binders, sized to hold the material below, plus 50% excess. Each manual shall contain, but not be limited to:
 - 1. Operational procedures for the overall systems including the "Sequence of Operation".

2. Instruction for the proper operation and maintenance of the system.
3. Factory issued technical, installation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- B. Manufacturers: Subject to compliance with requirements, **provide products by one of the following:**
- C. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 1. Centrum Sound
 2. Listen Technologies
 3. Phonic Ear
 4. Telex
 5. Williams Sound
 6. Or equal
- D. Source Limitations: Obtain materials and accessories from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
- B. Assistive-listening systems shall be provided in accordance with CBC Section 11B-219 and shall comply with CBC Section 11B-706.
 1. 11B-706.2 Receiver Jacks

Receivers required for use with an assistive listening system shall include a 1/8 inch (3.2mm) standard mono jack.
 2. 11B-706.3 Receiver Hearing-Aid Compatibility

Receivers required to be hearing-aid compatible shall interface with telecoils in hearing aids through the provision of neckloops.

3. 11B-706.4 Sound Pressure Level

Assistive listening systems shall be capable of providing a sound pressure level of 110 dB minimum and 118 dB maximum with a dynamic range on the volume control of 50 dB.

4. 11B-706.5 Signal-To-Noise Ratio

The signal-to-noise ratio for internally generated noise in assistive listening systems shall be 18 dB minimum.

5. 11B-706.6 Peak Clipping Level

Peak clipping shall not exceed 18 dB of clipping relative to the peaks of speech.

C. The minimum number of receivers to be provided shall be equal to 4% of the total number of seats, but in no case less than two. 25% minimum of receivers provided, but no fewer than two, shall be hearing-aid compatible in accordance with CBC Section 11B-706.3.

D. If the system provided is limited to specific areas or seats, then such areas or seats shall be within a 50-foot viewing distance of, and have a complete view of, the stage or playing area CBC Section 11B-219.4.

2.3 TRANSMITTER:

A. Provide assistive listening system transmitter with four preconfigured selectable application resets.

1. Hearing assistance

2. Music

3. Voice

4. An additional auxiliary input feature allowing the user to add another audio source, i.e., MP3 or CD player, providing the ability to mix that auxiliary input with any microphone input.

B. Provide auto-detection of channel interference for automated channel switching as needed.

- C. Provide Centrum Sound System type PPA 377 or equal.

2.4 SINGLE CHANNEL RECEIVER

- A. Provide Centrum Sound System Type PPA R37N or equal.

2.5 MULTI-CHANNEL RECEIVER

- A. Provide Centrum Sound System Type PPA R35-8N or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Perform this work in accordance with acknowledged industry and professional standards and practices, existing build conditions, and as specified herein. Provide and install all materials, devices, components, and equipment for complete, operational systems.
- B. Maintain a competent supervisor and supporting technical personnel, acceptable to the Construction Manager, during the entire installation. Change of the supervisor during the project will not be acceptable without prior written approval from the Owner, the Construction Manager, and the Architect.
- C. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by others, notify the Architect; the Architect's decision will be binding. Verify all field conditions.

END OF SECTION

SECTION 28 16 00
INTRUSION DETECTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Security Control Panel.
 - 2. Initiation Devices.
 - 3. Notification Devices.

1.2 RELATED WORK

- A. Section 26 05 33 - Raceways and Boxes for Electrical Systems.
- B. Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables.
- C. Section 28 05 00 - Basic Electronic Safety and Security System Requirements.
- D. Section 28 46 00 - Fire Detection and Alarm Systems.

1.3 REFERENCES

- A. California Electrical Code (CEC).
- B. UL 294 - Standard for Access Control Systems.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 28 05 00.
- B. Product Data Submittal: Provide manufacturer's technical product specification sheet for each individual component type. Submitted data shall show the following:
 - 1. Manufacturer installation and programming certifications. The first pass submittal will be rejected if this is not submitted along with the remaining submittal items.
 - 2. Compliance with each requirement of these documents. The submittal shall acknowledge each requirement of this section, item-by-item.
 - 3. All component options and accessories specific to this project.
 - 4. Electrical power consumption rating and voltage.
 - 5. Battery calculations to verify the system functionality length provided by the manufacturer.
 - 6. Wiring requirements.
- C. System Drawings: Project-specific system CAD drawings shall be provided as follows:
 - 1. Provide a system block diagram noting system components and

interconnection between components. The interconnection of components shall clearly indicate all wiring required in the system. When multiple pieces of equipment are required in the exact same configuration (i.e., multiple identical controllers), the diagram may show one device and refer to the others as "typical" of the device shown.

2. Provide schedules describing each system input location by an architecturally familiar reference (i.e., Door 312A). The architectural door schedule shall be used as the basis.
- D. Submit detailed description of Owner training to be conducted at project end, including specific training times.
- E. Quality Assurance:
1. Provide materials documenting experience requirements of the manufacturer and Installing Contractor.
 2. Provide system checkout test procedure to be performed at acceptance. Test procedures shall include all external alarm events.
- F. Coordination Drawings:
1. Include all ceiling-mounted devices in composite electronic coordination files. Refer to Section 28 05 00 for coordination drawing requirements.

1.5 SYSTEM DESCRIPTION

- A. This specification section describes the furnishing, installation, commissioning and programming of a complete, turnkey security management system.
- B. Performance Statement: This specification section and the accompanying access control-specific design documents are performance based, describing the minimum material quality, required features, and operational requirements of the system. These documents do not convey every wire that must be installed and every equipment connection that must be made. Based on the equipment constraints described and the performance required of the system, as presented in these documents, the Vendor and the Contractor are solely responsible for determining all wiring, programming and miscellaneous equipment required for a complete and operational system.
- C. Basic System Description: The security management system shall provide an integrated hardware and software solution for access control.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit documents under the provisions of Section 28 05 00.
- B. Provide final system block diagram showing any deviations from shop drawing submittal.
- C. Provide statement that system checkout test, as outlined in the shop drawing submittal, is complete and satisfactory.
- D. Provide schedules documenting:
1. Controller installation locations including specific door numbers being controlled.

2. All terminal block wiring, including cable numbers.

E. Warranty: Submit written warranty and complete all Owner registration forms.

F. Complete all operation and maintenance manuals as described below.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit documents under the provisions of Section 28 05 00.

B. Operation Data: Provide full system operation instructions for each piece of equipment.

C. Maintenance Data: Document any manufacturer's recommended preventative maintenance procedures to be performed by the Owner.

1.8 QUALITY ASSURANCE

A. Manufacturer: The access control system shall be a single-source manufacturer such that the single vendor distributes, supports, warranties and services all components. The manufacturer shall have a minimum of five (5) years documented experience.

B. Installer: The installing dealer must be a factory-authorized service and support company specializing in the selected manufacturer's product, with demonstrated prior experience with the selected manufacturer's system installation and programming.

C. Servicing Contractor: The manufacturer of the system must have local service representatives within 60 miles of the project site.

1.9 WARRANTY

A. Unless otherwise noted, provide warranty for one (1) year after Date of Substantial Completion for all materials and labor.

B. The warranty shall include emergency service and repair on-site, with acknowledgment response time of one (1) hour from time of notification and on-site response within four (4) hours. The system shall be repaired and restored to operation within twenty-four (24) hours of notification.

C. Refer to the individual product sections for further warranty requirements of individual system components.

PART 2 - PRODUCTS

2.1 INTRUSION DETECTION SYSTEM PRODUCTS

A. Contractor to provide and install Digital Monitoring Products, Incorporated (DMP) equipment as identified within the specifications and unless otherwise noted.

1. Existing XR550N Command Processor Panel (Building A).

2. Detection equipment shall be hard-wired and communicate to the system by way of the control panel loop expansion bus and meet or exceed features offered in the following products:

a. Motion Detector – DMP Model DX-60 (wall mount with built-in zone expander).

- b. Motion Detector – DMP Model FX-360 (ceiling mount 360’ – requires DMP zone expander).
 - c. Bus Splitter/Repeater Module – DMP Model 710.
 - d. Zone Expander – DMP Model 714.
 - e. Output Expansion Module - DMP Model 716.
 - f. Graphic Annunciator Module - DMP Model 717.
 - g. Dual Tone Siren fully tampered and weather-resistant – Ademco 748LC or approved equal rated for outdoor use.
 - h. Keypad – DMP Model 7060N Thinline LCD Keypad.
 - 3. Contractor to perform all programming of school’s independent intrusion detection system to ensure a complete and working system to the Owner’s satisfaction. Coordinate with the Owner specific areas within the building to be armed. Coordinate with the Owner user access levels for the system and program a minimum of fifty users and pass codes for the initial startup of the system. System shall report all “Opening” and “Closing” reports by individual user.
 - a. Security Contractor shall install DMP intrusion detection systems in a locked enclosure with a tamper switch.
 - b. Security Contractor shall coordinate the installation of network and telephone line connections inside the enclosure.
 - c. Security Contractor shall install the arming station keypads at locations identified and coordinated with Owner.
- B. Motion Detectors:
- 1. Security Contractor to provide and install directional or 360 degree motion detectors at every classroom, office, hallway, conference room, meeting room, work room, lounge, kitchen, multipurpose room, library, and any restroom with an exterior door.
 - a. Motion detectors shall be individually wired to building zone expanders and combined into alarm zones ONLY within distinct sections, wings, or areas within the school.
 - b. Zones must be identified in Contractor shop drawings and submitted for approval prior to installation.
 - c. Each detector shall have an EOL resistor at the detector.
 - d. Resistors shall be installed at the EOL as a pre-manufactured device with values to match the system installed.
- C. Labels:
- 1. All labels for all cabling, power supplies, AC power cords and any connection to the security equipment shall be clearly labeled to identify the connected device or purpose. Labels shall be vinyl wrap with clear over lay so as not to

become unraveled and shall not be made of plastic. Labels shall be placed as close to the wire termination point as possible and not placed on equipment that can be removed or replaced.

2. All labels for security equipment shall be clearly applied so as to easily identify the device or system served. Provide labels for all mounted and installed equipment including the exterior of enclosures, power supplies, UPS and other equipment. Labels shall be vinyl and not made of plastic.

D. Tamper Switches:

1. Security contractor to provide and install magnetic tamper switches on all new enclosures and power supplies.

2.2 WIRE AND CABLE

A. Wire and Cable Specifications:

1. Security Contractor shall follow the manufacturers' recommendation for cabling or the minimum requirements of the Specifications.
2. Cables are to be shielded as necessary to preclude any outside noise or interference from entering the cable and degrading system performance. All cables shall be U.L. Listed, and appropriate for the application.
3. Use proper grounding practices to eliminate shorts, ground faults, ground loops, RF interference, voltage fluctuations, foreign voltages, and open circuits.
4. Coordinate with the Owner's representative for telephone line requirements and location for off- site monitoring.
5. Cables run underground, under slab, or in slab shall be installed in conduit and rated for direct- burial application. Cables above hard ceiling or inaccessible areas shall be installed in conduit or 'stub-up' conduits from within walls into accessible spaces.
6. All cables run in environmental air handling spaces shall be plenum rated. Utilize existing cable pathway where available and provide proper J-hook support for cables not run in conduit.
7. All Cable shall be run in unbroken lengths of 1000 feet or less. No power cables less than 1000 feet shall be spliced. When cable cannot be run in unbroken lengths due to cable spool limitations, splices shall be made in junction boxes with terminal blocks or terminal strips and fork spade lugs. All splices and junction boxes shall be clearly marked on the "As-Built" Record Drawings.
8. All wire to wire splices not utilizing terminal blocks or terminal strips shall be done with solder and electrical tape. Wires shall be individually soldered and taped, then neatly taped together to form the narrowest splice possible for ease of installation and removal, as well as overall protection of the splice. The use of all crimp type and screw type connectors i.e. beans, top hats, butt connectors, snap caps, wire nuts, and the "twist and tape" method are prohibited.
9. All End-of-Line supervision resistors shall be installed at the individual

protection devices, and not in the control panels.

10. Wiring shall be grouped and harnessed to facilitate access to all equipment, as well as maintenance and replacement of equipment.
11. All cable shall be labeled at origin and termination, referencing to a master legend schedule as shown on "As-Built" Record Drawings. Labeling and any splice locations shall be noted on "As-Built" Record Drawings. All labels shall be done using machine generated cable tags in the "flagged" position. Hand written labels are not acceptable.
12. Cabling shall be sized and installed according to California Electric Code requirements.
13. Any cabling or raceway exposed to weather shall be rated for that use.
14. All final labeling shall be with machine-generated printed labels, specifically made for cable labeling. No handwritten labels will be accepted. All wiring including power cords and feeds, network connections, and system cabling shall be fitted with a machine generated label identifying the device or point served. The id marker for each label shall have the device number and name.
15. Each enclosure shall have a security As-Built Drawing with point list and naming / numbering to match the machine generated labeling on cables terminated to the panels and power supplies.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION

- A. A series of meetings shall be required to coordinate the functionality and requirements at each door and shall be required prior to the start of installation of any device or cable but after submittals and qualifications have been fully approved. The meeting will include coordination with the security contractor, door hardware contractor, Architect, Owner, Engineer, and any other contractor involved with the installation of the system. The meeting shall be chaired and lead by the Contractor and shall include, but not limited to, the following topics:
 1. Zone requirements for each building including but not limited to:
 - a. Door hardware coordination and order of operation to each door.
 - b. Glass break device zones.
 2. Lockdown sequence including arming and disarming requirements.
 3. Integration and programming requirements for integrating with the access control system.
 4. Sample of the laminated map identifying supporting zones at each building with device locations and door information.
 5. Coordinate connection requirements for a third-party monitoring service.
 6. Training requirements and review.

3.2 INSTALLATION

- A. Comply with the manufacturer's instructions and recommendations for installation of all products.
- B. Provide all system wiring between all components as directed by the manufacturer.
- C. Mount all readers where shown on plans in accordance with Americans with Disabilities Act (ADA) requirements.
- D. Locate all request to exit motion detectors directly above the door frame, centered on the door opening. Adjust sensitivity to permit operation on motion of persons within 2'-0" of door. Avoid false activation by persons passing by where possible.
- E. Provide wiring to the request-to-exit devices located in the electrified door hardware.
- F. Install, terminate and test all door alarm contacts. Contacts shall be recessed in the door header.

3.3 FIELD QUALITY CONTROL

- A. Where these specifications require a product or assembly without the use of a brand or trade name, provide a product that meets the requirements of the specifications, as supplied and warranted by the system vendor. If the product or assembly is not available from the system vendor, provide product or assembly as recommended by the system vendor.
- B. Periodic observations will be performed during construction to verify compliance with the requirements of the specifications. These services do not relieve the Contractor of responsibility for compliance with the Contract Documents.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Installation shall be performed by a factory-trained and certified Contractor Installer.
- B. The Installer shall provide a comprehensive, site-specific customer planning guide for the system. The installer shall conduct a conference with the Owner prior to any installation to discuss the programming options of the system and the planning guide. The result of this planning guide shall be the determination of the system access policies for each point.
- C. The Installer shall include labor for all planning and all programming activities required to implement the Owner's access policies for each system point. Any software programmable access policy, within the bounds of the hardware specified, shall be included.
- D. It shall be the responsibility of the Contractor/Installer to provide a complete, functional system as described by the Contract Documents. These responsibilities include:
 - 1. Complete hardware setup, installation and wiring, and software configuration of the system.
 - 2. Complete programming of all operator software in accordance with the Owner's access policies determined by the planning guide conference.
 - 3. Complete system diagnostic verification.

- E. The Installation Contractor shall be present at two (2) four-hour meetings to coordinate all door hardware requirements with the door hardware vendor.

3.5 SYSTEM ACCEPTANCE

- A. The SMS Vendor shall submit for review a formal acceptance and system checkout program. The system checkout procedures shall include all system components and software, including but not limited to all system computers, field controllers, card reader devices, biometric readers and remote system interfaces. The Contractor shall perform the tests and document all results under the supervision of the manufacturer's system engineer.
- B. All operational scenarios, as defined by the customer planning guide, shall be tested to simulate the actual use of the system in the normal operating environment. The successful completion of these operational scenarios shall be documented.

3.6 SYSTEM DOCUMENTATION

- A. Complete documentation shall be provided for the system. The documentation shall describe:
 - 1. All operational parameters of the system.
 - 2. Complete documentation of programming and access policies.
 - 3. All data sets.
 - 4. Complete operating instructions for all hardware and software.
- B. The following sections shall be provided in the system documentation:
 - 1. User Manual: A step-by-step guide and instructions detailing all system user functions.
 - 2. Technical Maintenance Manual: A comprehensive document providing all maintenance actions, system testing schedules, troubleshooting flowcharts, functional system layout, wiring diagrams, block diagrams and schematic diagrams.

3.7 SYSTEM TRAINING

- A. All labor and materials required for on-site system training by a certified representative of the system manufacturer shall be provided. Training shall be conducted at the project site using the project equipment.
- B. Provide two weeks advanced notice of training to the Owner.
- C. Provide a training outline agenda describing the subject matter and the recommended audience for each topic.
- D. At a minimum, the following training shall be conducted:
 - 1. Alarm Monitoring Users: Provide a detailed course outlining the operational features of all aspects of the user interface. Topics shall include alarm monitoring functions, reports, error handling, alarm handling, output relay control and general overview of the report hardware.

E. Minimum on-site training times shall be:

1. Alarm Monitoring Users: One day.

END OF SECTION

07/11/19

SECTION 28 46 00

FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide a complete and operable system in accordance with the letter and intent of this specification section and with applicable Codes and Regulations as interpreted by the Authorities having jurisdiction. This Section is a performance specification and the detailed system design shall be done by the system manufacturer. The system shall comprise all necessary component parts to provide the functions and facilities described and to obtain the approvals requested. The system layout indicated on the drawings is only tentative and the types and quantities of system devices and raceways are minimums which shall be revised and augmented as required by the system to be provided.
- B. The entire system shall conform to applicable Codes. Equipment shall be U.L. listed, Factory Mutual listed and approved, approved, currently listed by the California State Fire Marshal, and shall conform to:
 - 1. California Code of Regulations:
 - a. Title 8 Industrial Relations.
 - b. Title 19 Public Safety.
 - c. Title 24 Building Standards Code.
 - d. California Electrical Code (CEC).
 - e. California Fire Code (CFC).
 - f. California Building Code (CBC).
 - 2. Americans with Disabilities Act (ADA).
 - 3. NFPA 72-2016 National Fire Alarm Code.

1.2 ACCEPTABLE MANUFACTURERS

- A. New fire alarm systems shall be furnished by the following manufacture only, no substitutions are allowed.
 - 1. Gamewell – FCI.
 - 2. No equal.

1.3 QUALIFICATIONS OF SYSTEM SUPPLIER

- A. Submit qualification of system supplier for approval based on the following minimum criteria:
 - 1. Successful experience in comparable installations which have been in operation for a period of not less than five years. Furnish a list of jobs and locations, with contact name and phone number, which fall in this category upon request.

2. Ability to provide emergency restoration service within 12 hours by factory certified personnel.
3. Installing contractor must have an office within San Diego County. That office must include 7/24 service department and must maintain spare inventory of all equipment used on this project.

1.4 DEFINITIONS

- A. Alarm Initiating Device Types: Manual stations, smoke detectors, heat detectors and sprinkler monitor modules.
- B. Alarm Signal: Signals from an alarm initiating device that signifies a state of emergency requiring building evacuation.
- C. Supervisory Signal: Indicates need for action regarding fire suppression or other protective system.
- D. Trouble Signal: Indicates that a fault, such as an open circuit or ground, has occurred in the system.
- E. Alarm indicating device: Horn, speaker or visual alarm device (strobe).

1.5 SUBMITTALS

- A. Data sheets and shop drawings:
 1. Submittals shall include State Fire Marshal Listing Sheets, including listing number with annual update and expiration date, for all system components. Submit installation shop drawings including scaled floor plans, complete point-to-point wiring schematics, list of all equipment with manufacturer's data sheets, the locations of each piece and device, battery and voltage drop calculations, and proposed conduit layout diagram, if conduit is required.
 2. Data sheets are required for all system components, including but not limited to: control panels, batteries, battery chargers, signal initiating devices, audible alarms, visual alarms, annunciators, transponders, terminals, cabinets, wiring, and relays.
 3. Fire Marshal approval of submittals is for permission to proceed and does not authorize design, products or installation not conforming to referenced codes and standards and this specification.
 4. Fire Alarm system central equipment. All cabinets shall be surface mounted on the wall approximately where indicated on drawings. Submit a proposed wall elevation of the cabinet layouts, sketched to scale, with the shop drawing package. Owner's representative will review the shop drawings and provide the Contractor a drawing which will exactly locate the cabinets.
- B. Operation and Maintenance Manuals: Manuals shall include all instructions necessary for proper operation and maintenance of the system, complete circuit diagrams, wiring and termination schedule for each circuit entering and/or leaving each piece of equipment and schematic diagrams of each major component, including a replacement parts list with part numbers, name, and telephone number of local supplier. Include all portions of the material list and shop drawings which are not included in the foregoing.

- C. Certification: Furnish written certification from the fire alarm system manufacturer that the system is in compliance with all applicable Code requirements.
- D. Training Agenda.
- E. Testing Documentation.
- F. Sequence of Operation: A description of the operation of the system with appropriate operator responses.
- G. Record Drawings: Documents shall include installation wiring, schematics, operation and maintenance manuals, complete replacement parts list. Drawings shall be reproducible type and shall be complete to facilitate trouble shooting and repair of the system.
- H. Spare Parts List: A list of recommended spare parts shown on plans.

1.6 SYSTEM DESCRIPTION

- A. The system shall be a complete, electrically supervised proprietary style fire detection and evacuation system with microprocessor based local operating system having the following capabilities, features and capacities:
 - 1. Communication between the local panel and the central monitoring station.
 - 2. The local system shall provide status indicators the following functions:
 - a. Audible and visual evacuation alarm circuit zone control.

1.7 SYSTEM ZONING

- A. The basic system shall be addressable.

1.8 SYSTEM OPERATION

- A. Activation of any fire alarm initiating device shall cause the following actions and indications at the local control panel:
 - 1. An alarm received shall sound an Temporal Code 3 evacuation alarm throughout the facility, and;
 - a. Display the initiating device.
 - b. Perform all control functions as detailed elsewhere in this specification.
- B. Receipt of any trouble report, shall cause the following actions and indications:
 - 1. Display at the local fire alarm control panel LED display, the origin of the trouble condition report.
 - 2. Activate trouble audible and visual signals at the control panel and as indicated on the drawings.

- a. Audible signals shall be able to be silenced from the fire alarm control panel by a trouble acknowledge switch.
- 3. Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
- C. Automatic Lockdown or Evacuation Voice Announcements:
 - 1. Provide 10 second continuous tone, followed by repeating prerecorded message, announcing either facility lockdown or evacuation as determined by activation of appropriate manual pull station in Administration area.
 - 2. Voice messages shall be submitted to and approved by the District.
- D. Manual Lockdown or Evacuation Voice Announcements:
 - 1. The control panel operator shall be able to make announcements via the push-to-talk announcement microphone over preselected speaker zones.
 - 2. Facility for total building announcement shall be accomplished by means of an "All Call" switch.
 - 3. A second backup microphone shall be located at the Administration office unless shown otherwise on drawings.

1.9 TRAINING

- A. Submit a proposed training agenda for review. The final, approved training agenda shall be submitted 14 days prior to the final system acceptance test.
- B. Train three operators with personal, on job instruction provided by competent personnel representing the manufacturer.
 - 1. Provide each operator with complete, printed operating instructions in manual or handbook form.
 - 2. Provide two distinct training sessions, with minimum training time of four hours each. Sessions shall be scheduled to suit the District. The first session shall be scheduled about the time of the final acceptance test and the second sometime during the first six months of operations. District will provide the conference room.
- C. Training shall include all system operational functions needed. This shall include, but will not be limited to:
 - 1. Alarm acknowledgment.
 - 2. Interpretation of the scheme used to provide identifiers.
 - 3. System operation.
 - 4. System reset.
 - 5. Basic troubleshooting.

6. Demonstrate that the system address assigned to each smoke detector corresponds correctly to device's field location.

1.10 SPECIAL TOOLS

- A. The Contractor shall supply as a part of the contract, three complete sets of any special tools or keys necessary for normal operation and maintenance of the system.

PART 2 - PRODUCTS

2.1 FIRE ALARM SYSTEM DESCRIPTION

- A. Intelligent reporting, networked, fully peer-to-peer, microprocessor-controlled fire detection and emergency voice alarm communication system.
- B. Each Signal Line Circuit (SLC) and Appliance Notification Circuit (NAC): Limited to 75 percent of its total capacity during initial installation.
- C. Basic Performance:
 1. Network Communications Circuit Serving Network Nodes: Wired using single twisted non-shielded 2-conductor cable or connected using approved fiber optic cable between nodes in a modified Class B configuration with #16 AWG minimum conductors.
 2. Signal Line Circuits Serving Addressable Devices: Wired Class B with #16 AWG minimum conductors.
 3. Initiating Device Circuit Serving Non-addressable Devices Connected to Addressable Monitor Modules: Wired Class B with the EOL resistor at the last device. Conductors shall be #16 AWG minimum.
 4. Appliance Notification Circuits Serving Strobes and Speakers: Wired Class B with the EOL resistor at the last device. Conductors shall be #14 AWG minimum for Strobes and #18 AWG minimum for Speakers.
 5. Alarm Signals Arriving at FACP: Not be lost following primary power failure until alarm signal is processed and recorded.
 6. Network Communications, Audio Evacuation Channels and Fire Phone Communications:
 - a. Communicated between panels and transponders on single pair of copper wires or fiber optic cables.
 7. Signaling Line Circuits:
 - a. Reside in remote transponders with associated audio zones.
 - b. Signal Line Circuit modules shall operate in peer-to-peer fashion with all other panels and transponders in system.
 - c. On loss of FACP, each transponder shall continue to communicate with remainder of system, including all Signal Line Circuit functions and audio messages located in all transponders.
 - d. Systems that provide a "Degraded" mode of operation upon loss of FACP shall not be acceptable.
 8. Audio Amplifiers and Tone-Generating Equipment: Electrically supervised for normal and abnormal conditions.
 9. Amplifiers: Located in transponder cabinets or in main panel.

10. Speaker Notification Circuits: Arranged such that there is a minimum of 1 speaker circuit per fire alarm zone.
11. Appliance Notification, Speaker Circuits, and Control Equipment: Arranged such that loss of any 1 speaker circuit will not cause loss of any other speaker circuit in system.
12. Speaker Circuits.
 - a. Electrically supervised for open and short circuit conditions.
 - b. If short circuit exists on speaker circuit, it shall not be possible to activate that circuit.
 - c. Arranged for 25 V RMS and shall be power limited in accordance with CEC.
 - d. Provide 25 percent spare capacity for future expansion or increased power output requirements.
13. Speaker Circuits and Control Equipment:
 - a. Arranged such that loss of any 1 speaker circuit will not cause loss of any other speaker circuit in system.
 - b. Systems utilizing "bulk" audio configurations shall not be acceptable.
- D. All components provided shall be listed for use with the selected system.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
- F. All components shall be listed by the California State Fire Marshal (CSFM).

2.2 FIRE ALARM SYSTEM OPERATIONAL DESCRIPTION

- A. When fire alarm condition is detected and reported by one of the system alarm initiating devices, the following functions shall immediately occur:
 1. System Alarm LEDs: Flash.
 2. Local Piezoelectric Signal in Control Panel: Sound at a pulse rate.
 3. 80-Character LCD Display: Indicated all information associated with fire alarm condition, including type of alarm point and its location within protected premises.
 4. Historical Log: Record information associated with fire alarm control panel condition, along with time and date of occurrence.
 5. System output programs assigned via control-by-event equations to be activated by particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
 6. Audio Portion of System: Sound tone (California Temporal Pattern) until system is reset.

2.3 FIRE ALARM CONTROL PANEL (FACP)

- A. Supply user interface, including touch-screen 1/4 VGA display, Intelligent Loop Interface Modules, manual switching, phone, and microphone inputs to the network. INCC shall consist of the following units and components:
 1. Power Supply Module with batteries.
 2. Intelligent Voice Command Center.
 3. 80-Character LCD Display.

4. Intelligent Loop Main Board Interface.
5. Intelligent Loop Supplemental Interface.
6. Ethernet card for network.
7. RS-485 Repeater.
8. Auxiliary Switch Module.

B. System Cabinet:

1. Surface or semi-flush mounted with texture finish. System Cabinet (B-, C-, or D-Size Cabinet) with associated inner door.
2. Available in at least 3 sizes to best fit project configuration.
3. Houses one or more Power Supply Modules, Voice Evacuation system, device zone loops, signal line circuits and other optional modules as specified.
4. Construction: Dead-front steel construction with inner door to conceal internal circuitry and wiring.
5. Wiring Gutter Space: A minimum of 1-inch wiring gutter space behind mounting plate.
6. Wiring: Terminated on removable terminal blocks to allow field servicing of modules without disrupting system wiring.

C. Power Supply Module: Use latest technologies to provide power to the FACP and incorporate the following features:

1. Power-saving switching technology using no step-down transformers.
2. 9-amp continuous-rated output to supply up to all power necessary under normal and emergency conditions.
3. Integral battery charger with capacity to charge up to 55 amp-hour batteries while under full load.

D. Batteries:

1. Sufficient capacity to provide power for entire system upon loss of normal AC power for a period of 24 hours with 15 minutes of alarm signaling at end of this 24-hour period, as required by NFPA 72, Local Systems.

E. Loop Interface modules:

1. Alarm Verification: Smoke detector alarm verification shall be standard option while allowing other devices such as manual stations and sprinkler flow to create immediate alarm. This feature shall be selectable for smoke sensors that are installed in environments prone to nuisance or unwanted alarms.
2. Alarm Signals: All alarm signals shall be automatically latched or "locked in" at control panel until operated device is returned to normal and control panel is manually reset. When used for sprinkler flow, "SIGNAL SILENCE" switch may be bypassed, if required by Authority Having Jurisdiction.
3. Electrically Supervised:
 - a. Each SLC and NAC circuit shall be electrically supervised for opens, shorts, and ground faults. Occurrence of fault shall activate system trouble circuitry, but shall not interfere with proper operation of other circuits.
4. Analog Smoke Sensor Test: system software shall automatically test each analog smoke sensor a minimum of 3 times daily. Test shall be recognized

functional test of each photocell (analog photoelectric sensors) and ionization chamber (analog ionization sensors) as required annually by NFPA 72. Failure of sensor shall activate system trouble circuitry, display "Test Failed" indication, and identify individual device that failed.

5. Signaling Line Circuits: Each module shall provide communication with analog/addressable (initiation/control) devices via 2 signaling line circuits. Each signaling line circuit shall be capable of being wired Class A or Class B. Circuits shall be capable of operating in NFPA Class A configuration when equipped with isolator modules between each module type device and isolator sensor bases. Each circuit shall communicate with a maximum of 99 analog sensors and 98 addressable monitor/control devices. Unique 40-character identifier shall be available for each device. Devices shall be of the Velocity series with capability to poll 10 devices at a time with a maximum polling time of 2 seconds when both SLCs are fully loaded.
6. Notification Appliance Circuits: 2 independent NAC circuits shall be provided, polarized and rated at 2 amperes DC per circuit, individually over current protected and supervised for opens, grounds and short circuits. They shall be capable of being wired Class B or Class A.
7. Alarm Dry Contacts: Provide alarm dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system supervisory condition occurs.
8. Trouble Dry Contacts: Provide trouble dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system trouble occurs.

F. Voice/Alarm Communication:

1. Voice Generation: Shall incorporate all processing to allow for 16 distinct pre-recorded messages used in priority fashion with message 1 as highest priority. Total length for 1 to 16 messages shall be up to 3 minutes.
2. Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of fire-alarm control unit.
3. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
 - a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
 - b. Programmable tone and message sequence selection.
 - c. Standard digitally recorded messages for "Evacuation" and "All Clear."
 - d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.
4. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
5. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

2.4 MANUAL PULL STATIONS

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
1. Manual Fire Alarm Stations: Non-code, non-break glass type, equipped with key lock so they may be tested without operating handle.
 2. Operated Station: Visually apparent, as operated, at a minimum distance of 100 feet from front or side.
 3. Stations shall be designed so after actual activation, they cannot be restored to normal except by key reset.
 4. Manual stations shall be construction of Lexan with clearly visible operating instructions provided on cover. The word FIRE shall appear on front of stations in raised letter, 1.75 inches or larger.
 5. Addressable manual stations shall, on command from control panel, send data to panel representing state of manual switch and addressable communication module status.
 6. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral] addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-V dc, nominal.
 2. Detectors shall be two-wire type.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
- B. Photoelectric Smoke Detectors
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.

- e. Sensor range (normal, dirty, etc.).

2.6 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
 - 1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of or a rate of rise that exceeds per minute unless otherwise indicated.
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.7 NOTIFICATION APPLIANCES

- A. Speakers:
 - 1. Compliance: UL 1480
 - 2. Operate on 25 or 70 VRMS or with field-selectable output taps from 0.25 to 2.0 watts.
 - 3. Speakers in Corridors and Public Spaces: Produce nominal sound output of 84 dBA at 10 feet, at one watt tap setting.
 - 4. Frequency Response: Minimum of 400 Hz to 4,000 Hz.
 - 5. Back of Each Speaker: Sealed to protect speaker cone from damage and dust.
 - 6. Audibility: NFPA 72.
- B. Strobes:
 - 1. Compliance: ADA, CBC, and UL 1971.
 - 2. Maximum Pulse Duration: 0.2 second.
 - 3. Strobe Intensity: UL 1971.
 - 4. Flash Rate: UL 1971.
 - 5. Strobe Candela Rating: Determine by positioning selector switch on back of device.
- C. Speaker/Strobes:
 - 1. Compliance: Speaker – UL 1480.
 - 2. Operate on 25 or 70 VRMS with field-selectable output taps from 0.25 to 2.0 watt.
 - 3. Speakers in Corridors and Public Spaces: Produce nominal sound output of 84 dBA at 10 feet at one watt tap setting.
 - 4. Frequency Response: Minimum of 400 Hz to 4,000 Hz.
 - 5. Back of Each Speaker: Sealed to protect speaker cone from damage and dust.
 - 6. Audibility: NFPA 72.
 - 7. Maximum Pulse Duration: 0.2 second.
 - 8. Strobe Intensity: UL 1971.
 - 9. Flash Rate: UL 1971.
 - 10. Strobe Candela Rating: Determine by positioning selector switch on back of device.

2.8 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
 - 1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.9 ADDRESSABLE INTERFACE DEVICE

- A. Addressable Dry Contact Monitor Modules:
 - 1. Provide to connect 1 supervised IDC zone of conventional alarm initiating devices (any N>O> dry contact device) to 1 of the fire alarm control panel SLCs.
 - 2. Mount in standard deep electrical box.
 - 3. IDC Zone: Suitable for Style B operation.
- B. Addressable Control Module:
 - 1. Provide to supervise and control operation of 1 conventional NAC of compatible, 24-VDC powered, polarized audio/visual notification appliances or UL-listed polarized relays for fan shutdown and other auxiliary control functions.
 - 2. Mount in standard 4-inch square, 2-1/8-inch deep electrical box or to surface-mounted back box.
 - 3. Control Module NAC: Wire for Style Z or Style Y (Class B/B) with up to 1 amp of inductive signal or 2 amps of resistive signal operation. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
 - 4. Audio/Visual Power: Provide by separate supervised power circuit from main fire alarm control panel or from supervised, UL-listed remote power supply.
- C. Addressable Relay Module:
 - 1. Available for HVAC control and other building functions. Relay shall have 2 Form C sets of contacts that operate in tandem and are rated for a minimum of 2.0 amps resistive or 1.0 amps inductive. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
 - 2. Mount in standard 4-inch square, 2-1/8-inch deep electrical box or to surface-mounted back box.

2.10 SPARE PARTS CABINET

- A. NEMA 1 cabinet with hinged lockable door and painted to match FACP, sized to accommodate the Maintenance Materials specified herein. Provide an engraved nameplate to read "FIRE ALARM SYSTEM SPARE PARTS CABINET".

2.11 NOTIFICATION DEVICES

- A. Evacuation Signaling Devices shall be furnished and installed as shown on the drawings, including the following features and capabilities:
 - 1. Visual signals shall be installed in accordance with the requirements of U.L.1971 standard and NFPA 72. Where multiple visual signals are visible from any location, circuitry shall be incorporated for synchronization of the flash rate.
 - 2. UL 1971 Listed for Emergency Devices for the Hearing Impaired in all public mode installations.
 - a. Strobes shall meet UL 1971 and produce a flash rate of one (1) flash per second minimum over the listed input voltage of 24 VDC.
 - 3. All visual signals shall incorporate a Xenon flashtube enclosed in a rugged Lexan lens or equivalent with solid state circuitry.
 - 4. The strobe intensity shall be rated per UL 1971 for 15, 75 or 110 Candela. Dual listing strobes of 15/75 intensity for UL1971/near-axis requirements shall be used where acceptable.
 - 5. The strobes shall be available for semi-flush or surface mounting and in conjunction with audible signals as required.
 - 6. For outdoor application in the private mode, the strobe shall be UL 1638 Listed and be rated for a temperature range of minus 32°F to 120°F.
- B. Audible evacuation signals shall be furnished and installed as shown on the drawings meeting the following requirements:
 - 1. Notification appliance shall be electronic and use solid state components.
 - 2. Each electronic signal shall provide eight (8) field selectable alarm tones. The tones shall consist of: tone, horn, march-time horn, code-3 horn, code-3 tone, slow whoop, siren, and hi/lo. Tone selection shall be by durable dip switch assembly and not clips or jumpers.
 - 3. The device shall have provisions for standard reverse polarity type supervision and in/out field wiring using terminals that accept #12 to #18 AWG wiring.

2.12 OFF SITE DIGITAL ALARM COMMUNICATIONS

- A. The control panel shall contain integral facilities for off-site digital reporting via site telephone lines. Upon sensing an alarm condition within the panel, the communicator shall capture an operational telephone circuit and automatically dial the Central Receiving Station. Upon making contact with either the primary or secondary Central Receiving Station numbers using either the primary or secondary outgoing lines, the communicator shall establish its system identity and report the alarm condition. The communicator shall include the following features and capabilities:
- B. Integral fire alarm control panel mounting and listing under U.L. standard 864 with the control panel. All operating power shall be derived from the control panel primary and secondary power sources.

- C. Operating data base firmware stored in non-volatile memory and permanently installed on the system mother board. Entry into the programming mode shall be password protected to prevent unauthorized modification. The system shall be programmable by use of the software and passcode, on site or remotely using the data reporting telephone line connections.
 - 1. Changes in central station telephone numbers shall be programmable without the requirement for a site visit, from the central station.
 - 2. The communicator shall be capable of reporting up to four conditions present within the control panel, as follows:
 - a. Fire Alarm Condition.
 - b. System Trouble Condition.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Installation shall be in accordance with the CFC, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
 - 1. Connect new equipment to existing control panel in existing part of the building.
 - 2. Connect new equipment to existing monitoring equipment at the supervising station.
 - 3. Expand, modify, and supplement existing monitoring equipment as necessary to extend existing monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Install wall-mounted equipment, with tops of cabinets not more than 6' foot above the finished floor.
- D. Manual Fire-Alarm Boxes:
 - 1. Install manual fire-alarm box in the normal path of egress within 5' feet of the exit doorway.
 - 2. Mount manual fire-alarm box on a background of a contrasting color.
 - 3. The operable part of manual fire-alarm box shall be 48" above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- E. Smoke- or Heat-Detector Spacing:
 - 1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 - 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 - 3. HVAC: Locate detectors not closer than 3' from air-supply diffuser or return-air opening.
 - 4. Lighting Fixtures: Locate detectors not closer than 2' from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.

- F. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- G. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- H. Signaling line circuit wiring installed in underground conduits shall be a shielded twisted pair cable of water-blocked construction sized as per Fire Alarm manufacturer's requirements. West Penn Aquaseal or equal.

3.2 PATHWAYS

- A. Pathways shall be installed in EMT, minimum 1-inch conduit size.
- B. Exposed EMT shall be painted red enamel.

3.3 CONNECTIONS

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 10 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Supervisory connections at valve supervisory switches.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 TEST

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72.

3.7 FINAL INSPECTION/INSTRUCTION

- A. At the final inspection a factory trained representative of the manufacturer shall demonstrate that the systems function properly in every respect.

- B. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- C. Provide the NFPA Certificate to the Owner, local fire official, and the Division of State Architect (DSA).

END OF SECTION

07/11/19

SECTION 321216

ASPHALT PAVING AND AGGREGATE BASE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Asphaltic concrete paving as indicated on the Drawings and specified herein.
- B. Principal items of Work:
 - 1. Preparation of subgrade
 - 2. Soil sterilization
 - 3. Aggregate base course
 - 4. Asphaltic surfacing materials
 - 5. Mixing asphaltic concrete material
 - 6. Placing asphaltic concrete pavement
 - 7. Flood test
- C. Related Sections:
 - 1. Excavation and Fill, Section 31 23 00.
 - 2. Earth subgrade preparation for asphaltic paving: Section 31 20 00 – Earth Moving.
 - 3. Water Utilities, Section 33 10 00.
 - 4. Sanitary Sewer and Storm Drainage Piping, Section 33 41 00.
 - 5. Storm Water Drains, Section 33 44 00.
 - 6. Utility Storm Water Treatment, Section 33 44 19

1.02 PERFORMANCE REQUIREMENTS

- A. Establishment of Grades:
 - 1. The Contractor shall be responsible for finished elevation grade stakes and other surveying necessary for the layout of the Work.
 - 2. Conduct operations in such a manner that the survey stakes shall be protected as long as their need exists. Be responsible for replacement of stakes.
 - 3. Areas having drainage gradients of 2% or more shall have elevation stakes, set with instrument, at grid intervals of 25 feet. Intermediate stakes may be set by using a tightly-drawn string line over the tops of adjacent stakes. Grade stakes must be set at all grade breaks, grade changes, etc.
 - 4. Areas having drainage gradients of less than 2 percent shall have elevation stakes, set with instrument, at 10 foot intervals. Grade stakes must be set at all grade breaks, grade changes, etc.

1.03 SUBMITTALS:

A. Provide the following:

1. Material Compliance Data Specifications.
2. Material Safety Data Specifications.
3. Copy of Installer's license.
4. Sterilization application data and purchase receipt.
5. Sample of aggregate for testing, if requested by engineer.
6. Data Sheets for seal coat and paint.

1.04 QUALITY CONTROL SUBMITTALS

A. Testing and Control of Materials:

1. Material shall meet the requirements specified herein. Laboratory tests of all of the materials will be required. If such tests meet the specified requirements, the laboratory test fees shall be paid by the Owner. If cost of subsequent tests fail to meet specified requirements, the costs of such tests shall be paid by the Contractor, and the Contractor shall immediately rectify the deficiency. Refer to Section 01 45 23 – Testing and Inspecting Services.
2. The Owner's inspector shall test the temperature of each batch of asphaltic concrete prior to placement. If asphaltic concrete temperature is not within tolerances as set forth in this Section of the Specifications the affected batch shall be rejected. Any and all costs due to the rejected asphaltic concrete shall be the responsibility of the paving contractor.

1.05 PROJECT SITE CONDITIONS

- #### A. Protect existing installations:
- Such installations, which are shown on the plan or whose location could be reasonably inferred and which become damaged or broken by the operations, shall be repaired or replaced at no cost to Owner.

PART 2 - MATERIALS

2.01 MATERIALS

- #### A. Soil Sterilization:
- The soils sterilant shall be in accordance with current EPA acceptable standard and the California Department of Pesticide Regulations for soils sterilant. Sterilant shall be selected as appropriate for the environment in which it is to be placed. Contractor shall be licensed with the State of California to apply sterilant.
1. Sterilant shall be commercial grade for commercial application. Contractor may obtain a list of acceptable sterilants from the District prior to bidding project.
- #### B. Base and Aggregate Base:
1. Base and Aggregate base shall conform to the State of California, Department of Transportation (CALTRANS) Standard Specifications, Current Edition. All base, whether called out as aggregate base or base shall be in conformance with CALTRANS Section 26 for Class 2 Aggregate Base, 3/4-inch maximum. The maximum percentage of recycled material allowable shall not exceed 50% of the total volume of aggregate used.
 2. Base and Aggregate Base shall be provided by a licensed commercial materials supplier. Certifications shall be submitted with each submittal. Use of on-site asphalt materials in aggregate base or base is strictly prohibited. The use of

Crushed Miscellaneous Base is strictly prohibited.

3. Base depth shall be in accordance with plans and specifications. If no depth is specified, the minimum depth shall be 4".
- C. Asphalt Concrete: Shall be produced by a commercial asphalt paving plant. Mineral aggregate and asphalt concrete production shall be in compliance with the State of California, Department of Transportation (CALTRANS) Standard Specifications, Current Edition.
1. Paving asphalt shall be per CALTRANS Section 39 Hot Mix Asphalt.
 2. All on site paving shall be PG-64, ½" maximum Medium Grade asphalt per CALTRANS, Section 92, unless otherwise specified by the geotechnical engineer.
- D. Asphalt Sealer: Sealer shall be LAS-320 by Enviroseal Corporation, 800-775-9474, or equal. Sealer cannot be installed for a minimum of 30 to 45 days after asphalt has been completed. Contractor shall account for this in his schedule. If asphalt must be striped prior to sealer, contractor shall account for sealer application and a subsequent restripe of any striping obscured by sealer.
- E. All stripes and markings shall be painted with two (2) coats of pavement parking paint, v.o.c. compliant, lead free, base acrylic copolymer TSP, TT-P-115F, Type I and TT-P-85E for parking lots (yellow and white); and regular dry waterborne traffic paint (red, yellow and blue), TT-P-1952B for curbs, fire lanes, accessible striping, etc. Paint curb red at fire lanes - refer to the Fire Access Site Plan. Asphaltic concrete seal coat shall be in place a minimum of 10 days before applying paint.
1. Apply parking stall lines as indicated on the Drawings. Parking stall lines shall be 3 inches wide and white in color. Edges shall be clean and sharp.
 2. Accessible Parking Stalls: Parking Spaces for persons with disabilities to be marked according to CBC 2016 Sections 11B-208, and 11B-502.
 3. Loading and unloading access aisle shall be marked by a border painted blue. Within the blue border, hatched lines a maximum of 36" on center shall be painted white to contrast with the parking surface. CBC Figures 11B-502.2, 11B-502.3, 11B-502.3.3, and 11B-503.3, Blue color shall conform to Color No. 15092 per Federal Standard 595B. Paint to be slip resistant and provide a minimum 0.6 static coefficient of friction. Refer to drawings for width of painted lines and markings on pavement (3" minimum).
- F. Application of Tack Coat
1. Apply tack coat at a rate of 0.05 to 0.15 gallon per square foot to cleaned contact surfaces of previously placed asphaltic concrete, abutting or projecting into asphaltic concrete paving and face of concrete curbs and walks. Protect exposed concrete.

- G. Detectable Warning Area Tile: Terra Paving, ADA-3 Truncated Domes, 12 inch by 12 inch, or Armor-Tile, truncated vitrified polymer dome tiles, as distributed by White-Cap Construction Supply, CBC, 2016, Title 24, Part 2, Section 11B-705.1.2.5
1. Detectable Warnings, CBC, 2016, Title 24, Part 2, Section 11B-705.1.2.5:
 - a. Square grid, in-line pattern:
 - b. Diameter of nominal 0.9 inch (22.9mm) at base tapering to 0.45 inch (11.4) at top.
 - c. Nominal height of 0.2 (5.08 mm) inch.
 - d. Nominal center to center spacing of 2.35 (59.7 mm).
 - e. Color "yellow" conforming to Federal Color No. 33538 per Standard No. 595B. CBC Sections 11B-705.1.2.5 and 11B-810.5.2.
 2. Provide a written five (5) year product warranty provided by the manufacturer of detectable warnings and directional surface products as equivalent to the evaluation and product approval program. Such warranty shall indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicates that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five (5) years after initial installation. Warranty will certify that the produce will not degrade significantly, meaning that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.
- H. Concrete Wheel Stops
1. Provide concrete wheel stops by San Diego Precast, or equal. Concrete shall be 4000 psi in 28 days. Provide two be galvanized dowels as anchorage, and glue wheel stop to asphalt surface. Dowels shall be hot dipped galvanized, 16-inch long, #4 reinforcing. Recess head of dowel beneath the top of the wheel stop. Wheel Stop shall be a minimum length of 6-feet.

PART 3 - EXECUTION

3.01 FINAL PREPARATION OF SUBGRADE

- A. Immediately prior to placing base or aggregate base, the subgrade shall be scarified to a depth of at least 12 inches, moistened, and the entire area thoroughly compacted by rolling to obtain a smooth, hard, even surface of 95 percent compaction at bus drop off and fire lane and 90 percent compaction elsewhere to receive the base or aggregate base. The subgrade shall be finished to the required grades with due allowance being made for the thickness of base course and finished surfacing to be placed thereon.
- B. Subgrade for the pavement structures shall not vary more than ± 0.04 feet from the specified grade and cross section.
- C. Areas inaccessible to power rolling or areas that cannot be compacted properly with power rollers shall be compacted with vibrating compactors or other suitable mechanical means which shall produce a firm foundation for the paving structure.

3.02 SOIL STERILIZATION

- A. The Contractor shall take whatever precautions are necessary to prevent contamination

of adjacent soil areas with sterilant and for the protection of personnel. Sterilant shall not be applied within two feet of planting areas.

- B. Certification shall be furnished to the Architect, showing the purchase receipt and rate of application of the material. Payment for soil sterilization will include full compensation for application and all materials and incidental work required.

3.03 AGGREGATE BASE OR BASE

- A. The base material shall be placed upon the finished subgrade after the subgrade has been properly prepared as herein specified. The base shall be placed in accordance with CALTRANS, Section 26.

3.04 DEFINITIONS

- A. For the purpose of compacting procedures the following definitions are used:
 - 1. Initial or Breakdown Rolling: The first coverage of a roller on asphalt concrete after the material has been placed to line and grade.
 - 2. Intermediate Rolling: The rolling performed immediately after the initial rolling. When completed, the pavement should meet job density requirements.
 - 3. Compaction Rolling: Including initial and intermediate rolling.
 - 4. Finish Rolling: The final rolling necessary to obtain the desired surface texture and eliminate roller marks. No further densification is anticipated in this operation.
 - 5. Coverage: The number of movements of a roller required to cover the entire width being paved at least once.
 - 6. Steel-Wheel Roller: A 2-wheel steel tandem roller weighing 8 to 10 tons.
 - 7. Pneumatic-tired Roller: A rubber-tired roller equipped with tires a minimum 7.50 x 15 in size, capable of being ballasted up to 12 tons.
 - 8. Vibratory Roller: A vibratory roller capable of imparting a dynamic force of at least 21,000 pounds.
 - 9. Maximum Laboratory Density: Density achieved on a sample of a material taken from a specific location at the job site under working conditions. This density can be obtained using the California Kneading Compactor per Test Method No. Cal. 304.
- B. Prior to paving, furnish manufacturer's certificates or literature demonstrating that rollers meet requirements specified above. Prior to paving, state which procedure will be used and do not change that procedure without the Engineer's approval.

3.05 PRIMARY LIFT SPREADING AND COMPACTION

- A. Asphalt concrete in excess of 2 inches in thickness, shall be placed in two (2) lifts, a primary lift, and a surface course. Surface Course shall be a minimum of 1 inch thick.
- B. Asphalt concrete shall be delivered to the project site at a temperature of not less than 260 degrees F. nor more than 320 degrees F.
- C. The depositing, distributing , and spreading of asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled paving machine, motor grader, spreader box, rock spreader, or similar equipment.
- D. Prior to spreading, a tack coat shall be applied to the vertical face of all curbs, gutters, and structures which will butt against the new pavement. A tack coat is required between courses if surface has been contaminated by dirt or oxidized by extended exposure. A diluted SS-type emulsion shall be used for tack coat and shall meet the requirements set forth in CALTRANS, Section 39 and Section 94.
- E. Certification: Provide certification that the asphalt aggregate mixture has at least 80 percent of compacted density values equal to or greater than 96 percent - and 100 percent equal to or greater than 95 percent - of a laboratory specimen prepared by the appropriate test method from a sample taken from a truck delivering mixture to the job site. Field density of compacted asphalt concrete shall be determined by:
 - 1. A properly calibrated nuclear asphalt testing device in the field, or
 - 2. ASTM D1188 when slabs or cores are taken for laboratory testing. Zinc stearate may be substituted for paraffin.
 - 3. In case of dispute, the procedure described under Sub-Item E (2.) above shall be used. Combination of rollers shall be allowed under this procedure.
- F. Steel-Wheel and Pneumatic: Apply a breakdown (initial) coverage with a steel-wheel roller loaded to 10 tons. Follow by intermediate rolling consisting of a minimum of 6 coverages of a pneumatic-tired roller, the tires being inflated a minimum of 60 psi cold and a maximum of 90 psi when hot. Finish rolling may consist of one coverage of an 8-ton tandem steel-wheel roller.
- G. Steel Wheel: Apply a minimum of eight coverages with a steel-wheel roller loaded to 10 tons.
- H. Vibratory: Compaction shall consist of at least six coverages with a vibratory roller. Rolling from the center to the edge shall be permitted, and all compaction rolling shall be accomplished before the mix temperature falls below 185 degrees F. Rolling shall commence at least one foot from edge of the mat after which the roller shall be gradually advanced to the edges. Within one foot of edge, the roller on its initial coverage shall advance to the edge in 4-inch increments. The roller shall be advanced to a supported edge first, if applicable. Rolling within one foot of an unsupported edge should be delayed to minimize possible distortion but completed at such time that proper densities are obtained after the completion of rolling. No roller shall be permitted to stand motionless on portion of the work before it has been properly compacted.

3.06 SURFACE COURSE SPREADING AND COMPACTION

- A. Surface course shall be 1-inch thick.
- B. At the time of delivery to the site of work, the temperature of mixture shall not be lower than 260 degrees F., or higher than 320 degrees F. Asphalt concrete shall not be placed when the atmospheric temperature is below 40 degrees F. or during unsuitable weather.
- C. The asphalt concrete shall be evenly spread upon the subgrade or base to such a depth that after rolling, it shall be of the specified cross section and grade of the course being constructed.
- D. The depositing, distributing, and spreading of the asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled mechanical spreading and finishing machine designed especially for that purpose and equipped with a screed or strike-off assembly capable of being accurately regulated and adjusted to distribute a layer of the material to a definite predetermined thickness.
- E. Spreading, once commenced, must be continued without interruption. No greater amount of the mixture shall be delivered in one day than can be properly distributed and rolled during that day.
- F. Compaction is the same as outlined in Paragraph 3.05, except as noted below:
 - 1. Steel-Wheel and Pneumatic: Apply a breakdown (initial) coverage with a steel-wheel roller loaded to 10 tons. Follow by intermediate rolling consisting of a minimum of four coverages of a pneumatic-tired roller, the tires being inflated a minimum of 60 psi cold and maximum of 90 psi when hot. Finish rolling may consist of one coverage of an 8-ton tandem steel-wheel roller.
 - 2. Steel-Wheel: Apply a minimum of six coverages with a steel-wheel roller loaded to 10 tons.
 - 3. Vibratory: Compaction shall consist of at least four coverages with a vibratory roller.
- G. As soon as the layer of asphalt concrete has been placed, it shall be thoroughly compacted by rolling. Rolling shall be commenced along the lower edge of the area to be rolled and shall be continued until the edge is thoroughly compacted, after which the roller shall be gradually advanced to the crown point, both sides being rolled in a like manner. Rolling shall be continued until the layer has become thoroughly compacted throughout and is true to grade and cross-section.
- H. Maintain rollers in good mechanical condition, and those that cannot be operated without jerking, or driven along a straight path, shall not be used. No leakage of petroleum products from roller shall be allowed to come in contact with the pavements being constructed, nor shall roller be permitted to stand motionless on portion of the work before it has been properly compacted.

Rolling surfaces shall be treated with water to prevent the adherence of the asphalt concrete, but the quantity used must not be such as to be detrimental to the surface being rolled.

3.07 FLOOD TESTING

- A. Flood Test: Before seal coat is applied, a water flood test shall be done in the presence of the Inspector. The flooding shall be done by water tank truck. Depressions where the water ponds to a depth of more than 1/8-inch shall be filled, or the slope corrected to provide proper drainage. The edges of the fill shall be feathered and smoothed so that the joint between the fill and the original surface is invisible.
- B. Seal Coat: After completing the flood test and the pavement has cured for 30 days, all new A.C. pavement shall receive a slurry sealer applied in accordance with the manufacturer's specifications.
 - 1. Areas to receive sealer shall be swept clean, and, before application, lightly sprayed with water, leaving it cool and damp but free of excess water.
 - 2. Make two or more applications using a total of at least 80 square foot/gallon, min.
 - 3. Each coat of sealer shall dry 24 hours before the succeeding coat is applied.
 - 4. The finished surface seal, when dry and thoroughly set, shall be smooth, tough, waterproof, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities. Should defect appear in the finished surface, apply as many additional coats of sealer as may be required to produce the specified finished surface at no additional cost. Protect from traffic during all operations and until the sealer is thoroughly set and cured and does not pick up under foot or wheeled traffic – min. of 24 hours. When cured and set, thoroughly wash off with water to remove excess residue before applying painted markings.
 - 5. Application shall be by spray method is possible. Brush method may be used when sealer is covering existing pavement and the pavement is in poor condition. Skid-slip resistance applications using sand are not acceptable.
 - 6. Repair any damage caused by construction traffic.

3.08 STRIPING

- A. Pavement Marking Paint: Vinyl acrylic type for use on asphaltic concrete and Portland cement concrete. Pavement Marking Paint: Vinyl acrylic type for use on asphaltic concrete and Portland cement concrete. Painted lines and markings on pavement shall be 3" minimum wide and blue in color equal to Color No 15092 per Federal Standard 595B. Refer to Paragraph 2.01 D., for additional paint striping information.
- B. Provide International Symbol of Accessibility for each accessible parking stall at location indicated in the Drawings. Symbol shall be 36 inches square, white on standard blue background, and ADA Accessibility Guidelines for Buildings and Facilities.
 - 1. Parking spaces for the disabled shall be marked according to CBC Sections 11B-208, and 11B-502.
 - 2. Refer to paragraph 2.01 D., for additional paint striping information.

C. Preparation:

1. Immediately before applying the paint, thoroughly clean the pavement surface of dust, dirt, sand, scale, water, oil, grease or other objectionable matter. Do not use solvent materials that will damage pavements as cleaning agent. Immediately before paint, give pavement surface a final cleaning by means of a power broom. Following the power brooming, use power blower containing compressed air.
2. Provide warning devices required to protect the painting operations and the finished work.

D. Application: Immediately following other preparation of the pavement surface, apply the striping at the rate of 100 to 110 square feet, per gallon of paint. Apply lines 4 inches wide unless otherwise indicated. Apply the stripe of the indicated or specified width with clean true edges and without sharp breaks. Repaint to the applicable specification portions of the stripe damaged by any type of traffic within 24 hours after the stripe has been applied.

E. Provide temporary striping where parking must be occupied prior to installation of seal coat.

3.09 CLEANUP

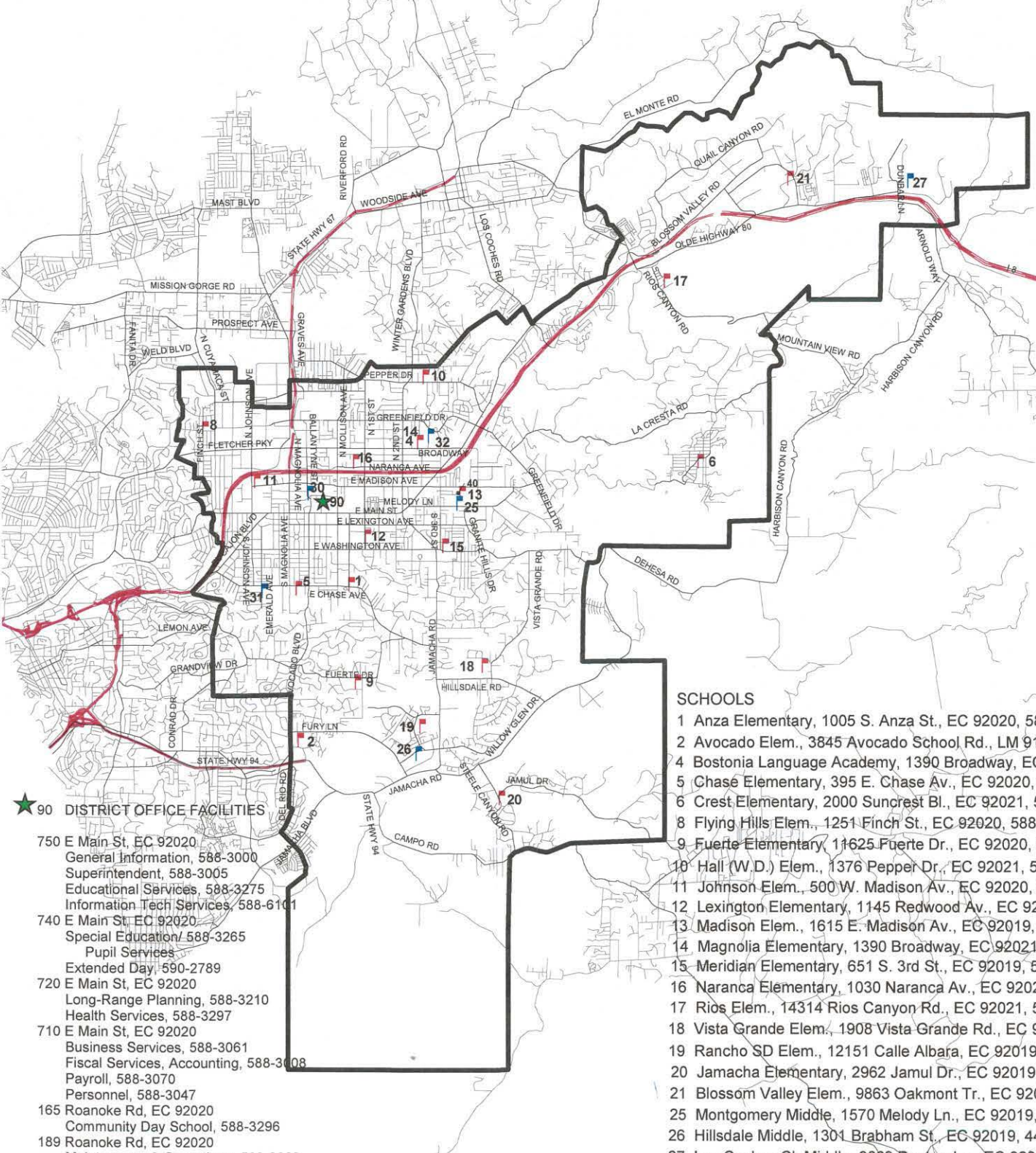
- A. Clean up the paved areas prior to acceptance of the work. Dirt, spoil, and debris of nature shall be removed, and the entire site shall present a clean, workmanlike appearance.
- B. Damage to paint work from paving or seal-coating operations shall be corrected.

END OF SECTION

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Cajon Valley Union School District

School & Department Locations



90 DISTRICT OFFICE FACILITIES

750 E Main St, EC 92020
 General Information, 588-3000
 Superintendent, 588-3005
 Educational Services, 588-3275
 Information Tech Services, 588-6101

740 E Main St, EC 92020
 Special Education/ 588-3265
 Pupil Services
 Extended Day, 590-2789

720 E Main St, EC 92020
 Long-Range Planning, 588-3210
 Health Services, 588-3297

710 E Main St, EC 92020
 Business Services, 588-3061
 Fiscal Services, Accounting, 588-3008
 Payroll, 588-3070
 Personnel, 588-3047

165 Roanoke Rd, EC 92020
 Community Day School, 588-3296

189 Roanoke Rd, EC 92020
 Maintenance & Operations, 588-3023

225 Roanoke Rd, EC 92020
 Child Nutrition, 588-3111
 Print Shop, 588-3046
 Purchasing, 588-3010
 Warehouse, 588-3026

721 E Park Av, EC 92020
 Transportation, 588-3177

SCHOOLS

- 1 Anza Elementary, 1005 S. Anza St., EC 92020, 588-3116
- 2 Avocado Elem., 3845 Avocado School Rd., LM 91941, 588-3100
- 4 Bostonia Language Academy, 1390 Broadway, EC 92021, 588-3121
- 5 Chase Elementary, 395 E. Chase Av., EC 92020, 588-3123
- 6 Crest Elementary, 2000 Suncrest Bl., EC 92021, 588-3128
- 8 Flying Hills Elem., 1251 Finch St., EC 92020, 588-3132
- 9 Fuerte Elementary, 11625 Fuerte Dr., EC 92020, 588-3134
- 10 Hall (W.D.) Elem., 1376 Pepper Dr., EC 92021, 588-3136
- 11 Johnson Elem., 500 W. Madison Av., EC 92020, 588-3139
- 12 Lexington Elementary, 1145 Redwood Av., EC 92019, 588-3075
- 13 Madison Elem., 1615 E. Madison Av., EC 92019, 588-3077
- 14 Magnolia Elementary, 1390 Broadway, EC 92021, 588-3080
- 15 Meridian Elementary, 651 S. 3rd St., EC 92019, 588-3083
- 16 Naranca Elementary, 1030 Naranca Av., EC 92021, 588-3087
- 17 Rios Elem., 14314 Rios Canyon Rd., EC 92021, 588-3090
- 18 Vista Grande Elem., 1908 Vista Grande Rd., EC 92019, 588-3170
- 19 Rancho SD Elem., 12151 Calle Albara, EC 92019, 588-3211
- 20 Jamacha Elementary, 2962 Jamul Dr., EC 92019, 441-6150
- 21 Blossom Valley Elem., 9863 Oakmont Tr., EC 92021, 588-3678
- 25 Montgomery Middle, 1570 Melody Ln., EC 92019, 588-3107
- 26 Hillsdale Middle, 1301 Brabham St., EC 92019, 441-6156
- 27 Los Coches Ck Middle, 9669 Dunbar Ln., EC 92021, 938-8600
- 30 Cajon Valley Middle, 550 E. Park Av., EC 92020, 588-3092
- 31 Emerald Middle, 1221 S. Emerald Av., EC 92020, 588-3097
- 32 Greenfield Middle, 1495 Greenfield Dr., EC 92021, 588-3103
- 40 Sevvick School, 1609 E. Madison Av., EC 92019, 588-3146
- 90 Community Day School, 165 Roanoke Rd., EC 92019, 588-3296