CONTRA COSTA COMMUNITY COLLEGE DISTRICT
C-526 Gym Annex Building Elevator
Contra Costa College, 2600 Mission Bell Drive, San Pablo, CA 94806
Date: May 21, 2014

NOTICE TO ALL CONTRACTORS

You are hereby notified of the following changes, clarifications and/or modifications to the original Contract Documents, Project Manual, Drawings, Specifications and/or previous Addenda. This Addendum shall supersede the original Contract Documents and previous Addenda wherein it contradicts the same, and shall take precedence over anything to the contrary therein. All other conditions remain unchanged.

This Addendum forms a part of the Contract Documents and modifies the original Contract Documents. Acknowledge receipt of this Addendum in space provided on the Bid Proposal Form. Failure to acknowledge may subject Bidder to disqualification.

A. Deletions, Additions, Changes, Revisions

Item:
1. Revise:
   a. Detail 2 / Sheet G-102 per attached sketch AD3-A1
   b. Detail 1 / Sheet G-103 per attached sketch AD3-A2
   c. Detail 2 / Sheet G-103 per attached sketch AD3-A3
   d. Detail 18 / Sheet G-103 per attached sketch AD3-A4
   e. Detail 1 / sheet A-111 per attached sketch AD3-A5
   f. General Note #11/SheetE-001 clarification: It is the intent of the contract documents that the home run conduits for fire alarm, data, telephone, and electrical be routed above ceilings within occupied spaces (such as corridor, office and restrooms) or exposed in non-occupied spaces (such as the boiler room, pool equipment room and electrical room).
   g. Detail A / Sheet EL111 per attached sketch AD3-E1
   h. Detail A / Sheet EP111 per attached sketch AD3-E2
   i. Detail A / Sheet ET111 per attached sketch AD3-E3
   j. Detail A / Sheet EF111 per attached sketch AD3-E4
   k. Detail A / Sheet EF113 per attached sketch AD3-E5
   l. Fixture Schedule Sheet E511 per attached sketch AD3-E6
m. Fixture Notes on Sheet E511 per attached sketch AD3-E7
n. Detail 1 One Line Diagram on Sheet E611 per attached sketch AD3-E8
o. Delete Section 10 14 00 Signage and replace with attached Section 10 14 00.
p. Delete Section 26 00 00 Electrical General Requirements and replace with attached section.
q. Delete Section 26 05 00 Basic Materials and Methods and replace with attached section.
r. Delete Section 26 50 00 Lighting and replace with attached section.
s. Delete Section 27 13 20 Data Communication System and replace with attached section.
t. Delete Section 28 31 00 Fire Detection and Alarm and replace with attached section.

2. Delete:
   a. Delete detail 15/G-103
   b. Delete detail 19/G-103
   c. Delete Sheet EF112 Library First Floor – Fire Alarm Plan
   d. Delete detail A Surface – Light Fixture Mounting Detail / Sheet E-511

3. Add:
   a. Pre-Bid Meeting Minutes, from meeting/Job Walk held on May 20, 2014

B. If you have any questions regarding this Addendum, please contact:

   Jovan Esprit, Contracts Manager
   Contra Costa Community College District
   500 Court St., Martinez, CA 94553
   Email: jesprit@4cd.edu
   Facsimile: 925-370-7512

   All other terms and conditions of BID are to remain the same.

   Lionakis
   1919 19th Street
   Sacramento, CA 95811
   Contact: Owen Letcher
   Phone: 916-558-1900

   [Stamp]

   Architect of Record: David P. Younger

   Division of the State Architect

   END OF ADDENDUM #3
NOTE:
SIGNS SHALL HAVE A MINIMUM AREA OF 70 SQ IN
SIGNAGE TO BE INSTALLED CENTERED AT EA PKG SPACE
GALV OR CADMIUM PLATED STL BOLTS, NUTS & WASHERS
THROUGH SIGN AND POST
SIGN PANEL OF 0.08" MIN ALUM SHEET, ENAMEL PAINTED
AFTER SMOOTHING WITH WHITE LETTERS, NUMBERS AND
BORDER STRIPE
CHARACTERS TO BE WHITE ON A BLUE BACKGROUND
ALL SIGNS TO HAVE 1/2" RADIUS AT THE CORNERS

1/2" = 1'-0"
TYP SIGN POLE & BASE FOR EXT MOUNTED SIGNS

1/2" = 1'-0"
PROVIDE INTERNATIONAL ACCESSIBILITY SYMBOL SIGNAGE ADJACENT TO MAIN ENTRY DOORS. PER CBC SECTIONS 1117B.5.8.1.2

INTERNATIONAL SIGN OF ACCESSIBILITY

LOCATE AT MAIN ENTRY DOOR(S)

BUILDING ENTRY SIGNAGE
NOTES:

1. EXISTING EXIT LIGHT RELOCATED.
   CONNECT TO EXISTING CIRCUIT WITH
   CONDUITS AND WIRES AS REQUIRED.

2. LIGHT FIXTURE, SWITCH & RECEPTACLE
   MOUNTED IN ELEVATOR Pit ARE FURNISHED
   BY THE MODULAR ELEVATOR MANUFACTURER
   INCLUDING OUTLET BOXES, CONDUITS & WIRES.

3. EXISTING EMERGENCY LIGHT RELOCATED
   CONNECT TO (E) CIRCUIT WITH CONDUITS
   AND WIRES AS REQUIRED.

4. LIGHT FIXTURE AND SWITCH IN ELEVATOR
   EQUIPMENT ROOM ARE FURNISHED BY THE
   MODULAR ELEVATOR MANUFACTURER,
   INCLUDING OUTLET BOXES, CONDUITS &
   WIRES.

5. PROVIDE BRANCH CIRCUIT HOMERUN TO
   PANEL FOR THE LIGHT FIXTURE.

GFI RECEPTACLE
DUPLICATED.

PROJECT
C-526 GYM ANNEX
BUILDING ELEVATOR

2600 MISSION BELL DRIVE,
SAN PABLO, CA 94806

DATE:
PROJECT NO: 011242.01

AGENCY

FILE NO. 7-C1
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

01-113694

AC____ FLS____ SS____

DATE____

REF TITLE
FIRST & SECOND FLOOR
LIGHTING PLANS

REF SHT REVISION DWG
EL111____ ADD # 3

AD3-E1
NOTES:

1. Door operator N.I.E.S. connect to existing circuit above the suspended ceiling with conduit & wires as required.

2. Elevator equipment N.I.E.S. connected by elevator contractor, including conduits & wires.

3. Junction box in elevator equipment furnished by the modular elevator manufacturer. Provide branch circuit homerun to panel as indicated.

4. GFI receptacle mounted in elevator pit & elevator equipment room furnished by the modular elevator manufacturer including outlet boxes, conduits & wires. Provide branch circuit homerun to panel.

5. Disconnect switch furnished by the modular elevator manufacturer. Provide branch circuit homerun to panel as indicated.

TO PANEL B, SEE ONE LINE DIAGRAM.

TYPICAL - PROVIDE EXPANSION/SEISMIC JOINT CONDUIT, SEE DETAIL C/E-511 WHERE CONDUIT CROSSES SEISMIC JOINTS.
6. Terminate telephone cables from elevator equipment room. Coordinate with owner to cross connect back to the telephone MPOE.

7. Provide fiber patch panel on wall above (E) FACP. Terminate all strands per owner’s requirements. Extend fiber to fire alarm system.

8. Telephone outlet box furnished by modular elevator manufacturer. Provide conduit & wire homerun to (E) SBB.

TYPICAL - PROVIDE EXPANSION/SEISMIC JOINT CONDUIT, SEE DETAIL-C/E-511 WHERE CONDUIT CROSSES SEISMIC JOINTS.
OUTLET BOXES & CONDUITS WITHIN THE ELEVATOR EQUIPMENT ROOM ARE FURNISHED BY THE MODULAR ELEVATOR MANUFACTURER. PROVIDE OUTLET BOXES & CONDUITS OUTSIDE THE ELEVATOR EQUIPMENT ROOM & ALL FIRE ALARM DEVICES & WIRING.

TYPICAL - PROVIDE EXPANSION/SEISMIC JOINT CONDUIT, SEE DETAIL-C/E-511 WHERE CONDUIT CROSSES SEISMIC JOINTS.

TO ABOVE

TO (E) FACP

TO (E) FACB

(E) STAIR

(E) BOILER ROOM

PROJECT
C-526 GYM ANNEX BUILDING ELEVATOR

2600 MISSION BELL DRIVE,
SAN PABLO, CA 94806

DATE:

PROJECT NO: 011242.01

AGENCY

FILE NO. 7-C1

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

01-113694

REF TITLE
FIRST & SECOND FLOOR FIRE ALARM PLANS

REF SHT
EF111

REVISION
ADD #3

DWG
AD3-E4
FIRE ALARM SYSTEM NOTES:

1. THE FIRE ALARM SYSTEM IS A COMPLETE PLAN SUBMITTAL.


3. INSTALLATION OF THE FIRE ALARM SYSTEM SHALL NOT BE STARTED UNTIL DETAILED PLANS AND SPECIFICATIONS, INCLUDING CALIFORNIA STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM, VOLTAGE DROP CALCULATIONS, AND BATTERY CALCULATIONS HAVE BEEN SUBMITTED AND APPROVED. IF THE INFORMATION ON THE BID DRAWINGS ARE REUSED AS THE SUBMITTAL DRAWINGS, CLOUD ALL CHANGES.

4. ALL CEILING HEAT AND SMOKE DETECTORS SHALL BE LOCATED AWAY FROM THE SUPPLY AIR REGISTER, DISTANCE AS RECOMMENDED BY EQUIPMENT MANUFACTURER.

5. BASIC SOUND AND PATTERN OF THE NEW FIRE ALARM AUDIBLE DEVICES SHALL SOUND THE CALIFORNIA FIRE ALARM SIGNAL IN TEMPORAL MODE.

6. PROVIDE COMPLETE SYSTEM WIRING. ALL WIRING SHALL BE IN MINIMUM 3/4" CONDUIT. NO OTHER SYSTEMS WIRING SHALL BE ROUTED IN THE FIRE ALARM CIRCUITS. HARDWIRED INITIATING CIRCUITS SHALL BE MINIMUM #14 THHN/THWN. SYSTEMS WIRING SHALL BE PER EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND THEIR REQUIREMENTS.

7. THE FIRE ALARM SYSTEM SHALL COMPLY WITH A TOTAL COVERAGE FULLY AUTOMATIC SYSTEM IN THE AREA OF WORK AS SHOWN ON THE DRAWINGS. DETECTORS SHALL BE INSTALLED IN ALL AREAS WHERE REQUIRED BY THE APPROPRIATE NFPA STANDARD OR THE AUTHORITY HAVING JURISDICTION. EACH INSTALLED DETECTOR SHALL BE ACCESSIBLE FOR PERIODIC MAINTENANCE AND TESTING. PROVIDE ACCESS DOORS AS REQUIRED.

TOTAL COVERAGE SHALL INCLUDE ALL ROOMS, STORAGE AREAS, ATTICS SPACES ABOVE SUSPENDED CEILINGS, AND OTHER SUBDIVISIONS AND ACCESSIBLE SPACES. INACCESSIBLE AREAS SHALL NOT BE REQUIRED TO BE PROTECTED BY DETECTORS UNLESS THEY CONTAIN COMBUSTIBLE MATERIAL, IN WHICH CASE THEY SHALL BE MADE ACCESSIBLE AND BE PROTECTED BY DETECTOR(S).

8. ALARM INDICATING DEVICES OF A FIRE ALARM SYSTEM SUBMITTED TO A FIRE.
## FIXTURE SCHEDULE

<table>
<thead>
<tr>
<th>SYM</th>
<th>MANUFACTURER &amp; CATALOG NUMBER</th>
<th>LAMPS</th>
<th>MOUNTING</th>
<th>SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>DATERITE 8J-232-120</td>
<td>2-FC22</td>
<td>SURFACE</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>DATERITE HLC-18C-120-PEC12</td>
<td>1-18CF QUA D</td>
<td>WALL 45'-0&quot;</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>APPLETON VPOEM10CF1312</td>
<td>1-13PL</td>
<td>ELEVATOR PIT</td>
<td>A</td>
</tr>
</tbody>
</table>

## FIXTURE SCHEDULE

<table>
<thead>
<tr>
<th>MOUNTING</th>
<th>SUBSTITUTE MANUFACTURER</th>
<th>REMARKS</th>
<th>WATTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFACE</td>
<td>Lithonia</td>
<td>PROVIDED BY THE MODULAR ELEVATOR MANUFACTURER</td>
<td>21</td>
</tr>
<tr>
<td>MALL 45'-0&quot;</td>
<td>Lithonia</td>
<td>WITH PHOTO-CELL</td>
<td>25</td>
</tr>
<tr>
<td>ELEVATOR PIT</td>
<td>Abolite</td>
<td>PROVIDED BY THE MODULAR ELEVATOR MANUFACTURER</td>
<td>16</td>
</tr>
</tbody>
</table>
**FIXTURE NOTES:**

1. All fluorescent light fixtures shall have T-8 lamps and electronic ballasts, unless otherwise indicated.

2. Luminaire/ballasts shall be certified per California Code of Regulations Title 24.

3. Lighting Compliance Notes: (NA) Non-applicable.
   - A. Building Lighting Shut-off: (NA)
   - B. Override for Building Lighting Shut-off: (NA)
   - C. Automatic Control Devices Certified: (NA)
   - D. Fluorescent Ballast & Luminaire: Note #2.

4. All lamps shall be 4100K.

G. Individual Room/Area Controls: Each room shall have individual room switching control by elevator manufacturer.

I. Control of exterior lights: (Photo-cell)
(E) PANEL-B
1200A, 208/120V, 3φ, 4W

NOTE:
The frame of all motors, elevator machines, controllers, and the metal enclosures for all electrical equipment in or on the car or in the hoistway shall be bonded in accordance with C.B.C. Article 250, Part V and VII.

Disconnect switch & elevator connection by the modular elevator manufacturer.
SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior Signages:
   1. Accessibility Signage.

B. Interior Signages:
   1. Accessibility Signage.

1.2 RELATED SECTIONS

A. Section 09 29 00 – Gypsum Board.

B. Section 09 24 00 – Portland Cement Plastering.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Unless otherwise noted, standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes as of the date of issue of this Project Manual.

C. Referenced Standards:
   1. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
   2. ADAAG – Accessibility Guidelines for Buildings and Facilities.
   5. 2010 California Building Code.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature and product specification for each product.

C. Shop Drawings: Submit shop drawing for each sign and plaque to show construction, sections, text, character spacing, and mounting details.

D. Samples: Submit sign and plaque colors, designs and sizes as specified in this Section and as shown on the Drawings for review.
1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum 5 years experience.

B. Regulatory Requirements:


   a. The International Symbol of Accessibility shall be the standard used to identify facilities that are accessible to and usable by physically disabled persons.

   b. Finish, Color, and Contrast: Characters, symbols, and their backgrounds shall have a non-glare finish. Characters and symbols shall contrast with their background and unless otherwise noted, characters and figures shall be white on blue background. Blue shall be Color No. 15090 in accordance with FEDSTD 595B.

   c. Proportions: Raised characters on signs shall be selected from fonts where the width of the uppercase letter “O” is 60 percent minimum and 110 percent maximum of the height of the uppercase letter “I”. Stroke thickness of the uppercase letter “I” shall be 15 percent maximum of the height of the character in accordance with CBC 1117B.5.5.15.

   d. Braille Symbols: Comply with CBC 1117B.5.6, California Contracted Grade 2 Braille. Dots shall be 1/10 inch on centers in each cell with 2/10 inch space between the cells, measured from the second column of dots in the first cell to the first column of dots in the second cell. Dots shall be raised a minimum of 1/40 inch above the background. Braille dots shall be domed or rounded.

2. Accessibility Signage:


      1) Tactile signs required by Section 1011.3 need not be provided with illumination.

      2) Tactile Stairway Signs (DSA-AC & SFM Requirements): Article 1022.8 “Floor Identification Signs.”


         a) Sign Finish: Article 1117B.5.2 “Finish and Contrast.”

         b) Sign Proportions: Article 1117B.5.3 “Proportions.”

         c) Sign Height: Article 1117B.5.4 “Character Height.”

         d) Raised and Pictorial Signs: Article 1117B.5.5 “Raised Characters and Pictorial Symbol Signs.”

         e) Braille Signs: Article 1117B.5.6 “Braille.”

         f) Sign Mounting: Section 1117B, Article 1117B.5.7 “Mounting Location and Height.”
g) Symbols: Section 1117B, Article 1117B.5.8 “Symbols of Accessibility.”

h) International Symbol of Accessibility: Section 1117B, Article 1117B.5.8.1
   “International Symbol of Accessibility.”

i) Entrance Signs: Section 1117B, Article 1117B.5.8.1.2 “Entrance Signs.”

c. Field Inspection: Signs and identification shall be field inspected after installation and
   approved by the enforcing agency, in accordance with Section 1117B, Article
   1117B.5.1.4.2 “Inspection.”

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer’s original containers, dry and undamaged, with seals and
   labels intact.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface
   contaminants, corrosion, construction traffic, and other potential damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Weidner Architectural Signage, Sacramento, CA; phone: 916-452-8000, URL:


4. Mohawk Sign Systems, Inc., Schenectady, NY; phone: 518-842-5303, URL:


B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Acrylic Plastic: Non-glare finish acrylic with integral color as manufactured by Romark or
   accepted equal. Thickness shall be 1/4 inch at door mounted restroom signs and 1/8 inch
   minimum at all other locations, unless noted otherwise. Colors as selected by Architect from
   manufacturer’s full range of colors.

B. Vinyl Sheet for Graphics: Precision cut with reflective surface; 5 to 7 year premium type;
   shall be in accordance with flammability requirements of ASTM E84; minimum 0.003 inch
   film thickness. Film shall include a precoated pressure sensitive adhesive backing or
   positionable pressure sensitive backing. Film shall be as manufactured 3M or accepted
   equal.

C. Anchors and Fasteners: Stainless steel conforming to ASTM F593.
2.3 EXTERIOR SIGNAGE

A. Accessible Signage: Provide the following signages in accordance with ADAAG and 2010 CBC where indicated on the Drawings.
      a. At Glass Surfaces: Vinyl decal applied to exterior surface of glass.

2.4 INTERIOR SIGNAGE

A. Accessible Signage: Provide the following signages in accordance with ADAAG and CBC where indicated on Drawings:
   1. Material: Acrylic plastic.
   2. Color: White symbols and characters on contrasting background. Color contrast between characters/symbols and the background shall be 70 percent minimum per CBC Section 1117.B.5.2. Colors as selected by Architect from manufacturer's full range of colors.
   3. Mounting Height:
      a. Doors: Symbols shall be centered horizontally on the door at a height of 60 inches above the finished floor or ground surface measured to the center of the sign.
      b. Walls: Signs shall be located 48 inches minimum above the finished floor or ground surface, measured from the baseline of the lowest line of Braille and 60 inches maximum above the finished floor or ground surface, measured from the baseline of the highest line of raised characters. Mounting location shall be determined so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of the door.
   4. Tactile Exit Signage: Provide acrylic plaque tactile exit signs with at least 5/8 inch high, but no higher than 2 inch high text and corresponding California Contracted Grade 2 Braille 3/8 inch below the text as indicated on Drawings.

2.5 FABRICATION

A. Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled be trial fit in the shop to ensure proper field assembly.

B. Drill or punch holes for bolts and screws; produce clean, true lines and surfaces.

C. Acrylic signs shall have inlaid acrylic copy/characters and Braille symbols as described in this Section.

D. Exposed work surfaces shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install signs and plaques level and plumb.

B. Accessible Building Entrance Signs: Apply to exterior glass surfaces using vinyl decals.
C. Exit Signs: Mount to door and wall surfaces with double faced adhesive foam tape strips and silicone adhesive.

D. Tactile Signage: Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where there is no wall space on the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

3.2 ADJUST AND CLEAN

A. Clean and Touch-up: Remove all packing and protection blemishes and thoroughly clean and polish all finish surfaces. Restore any marred or abraded surfaces to their original condition by touching up in accordance with the manufacturer's recommendations. Touch-up shall not be obvious.

B. Defective Work: Remove and replace all defective work that cannot be properly repaired, cleaned or touched-up, as directed by the Architect, with no additional cost to the Owner.

C. Protect installed work during the construction period to prevent abuse and damage.

3.3 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

END OF SECTION
SECTION 26 00 00

ELECTRICAL GENERAL REQUIREMENTS

PART 1  GENERAL

1.1  WORK INCLUDED

A. Furnish and install all necessary labor, materials, tools and equipment to perform and completely finish the work according to the intent of this specification, and the accompanying drawings.

B. Furnish and install any incidental work which can reasonably be inferred as required and necessary to provide complete and workable systems.

C. Provide connections of all equipment specified under these sections and other Divisions including Divisions 22 (Plumbing) and 23 (HVAC) including installation and connection of all motors, relays, remote starters, etc.

D. The requirements of the General and Supplemental Conditions, and Division 01 apply to Divisions 26, 27 and 28, and these specifications. All sections in Divisions 26, 27, and 28 are interrelated. Work specified in other sections, as applicable, shall apply to all work hereunder.

1.2  LOCAL CONDITIONS

A. Examine site; verify dimensions and locations against drawings and become informed of all conditions under which work is to be done before submitting proposal. No allowance will be made for extra expenses because of omission on Contractor's part to include cost of work under prevailing conditions.

B. Information shown relative to services is based upon available records and data shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made without extra cost.

C. Extreme care shall be exercised in excavating near existing utilities to avoid any damage thereto. It shall be the contractor's responsibility to verify existing underground utilities prior to digging anywhere. Information provided on these plans indicating existing conditions shall only be used as reference, and shall not be deemed considered accurate. Any damage to existing utilities done by the contractor shall be repaired and/or replaced by the contractor at their expense to its pre-damage condition.

1.3  PERMITS AND INSPECTIONS

A. Per Division 0 and 1.

1.4  CODES AND STANDARDS

A. Work and materials shall be in full accordance with California Occupational Safety Health Act (CAL-OSHA), California Electrical Code (CEC), State Fire Marshal, Electrical Safety Orders (Title 8, Subchapter 5), the National Fire Protection Association, California Building Code (CBC); California Code of Regulations - Title 24 and other applicable State or local laws or
regulations. Nothing in the Drawings or Specifications shall be construed to permit work not conforming to these codes.

B. Electrical materials shall bear the label of, or be listed by, the Underwriter's Laboratories (UL) unless of a type for which label or listing service is not provided.

C. Materials and components shall conform to Industry Standards, including:

- NEMA  - National Electrical Manufacturer's Association
- ANSI  - American National Standards Institute
- ASTM  - American Society For Testing Material Association
- IPCEA  - Insulated Power Cable Engineer's Association
- CBM   - Certified Ballast Manufacturers

D. When Contract Documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.

1.5 REVIEW OF MATERIALS

A. Per Division 0 and 1

1.6 RECORD DRAWINGS

A. Per Division 0 and 1.

1.7 ADDENDA AND CHANGE ORDERS

A. Changes in the plans and specifications shall be made by Addenda or Change Orders signed by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials mentioned herein or on drawings require that each item listed be provided and of quality noted, or an approved equal. All material shall be new, full weight and standard in all respects and in first-class conditions. Where possible, all materials used shall be of the same brand or manufacturer throughout for each class of material or equipment.

B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein. Dimensions, sizes and capacities shown are a minimum and shall not be changed without permission of Engineer.

PART 3 EXECUTION

3.1 DRAWINGS AND COORDINATION

A. Examine Drawings and Site; be familiar with types of construction where electrical installation is involved. Work shall be neatly installed in a workmanlike manner in accordance with NECA Standard of Installation. Work shall be coordinated with other trades to avoid conflicts. Clarifications will be made by Engineer and minor adjustments shall be made without
additional cost to Owner. Obtain ruling from Engineer concerning any obvious discrepancies or omissions in work before bidding. All work involved in correcting obvious errors or omissions after award of Contract shall be performed as directed by Engineer without additional cost to Owner.

B. Layouts of equipment, accessories and wiring systems are diagrammatic (not pictorial), but shall be followed as closely as possible. Drawings and Specifications are for assistance and guidance, and exact locations, distances, levels, etc., will be governed by Site.

C. All equipment (devices, conduits, boxes, etc.) shall be flush or semi-flush mounted unless otherwise noted. Where conditions do not allow flush mounting and where acceptable to the Architect, equipment may be surface mounted.

3.2 WORKING SPACE

A. Provide adequate working space around electrical equipment in compliance with Article 4 of Electrical Safety Orders. In general, provide 36 inches minimum clear work space in front of panelboards and controls of 120/208 volt systems.

3.3 CARE AND CLEANING

A. All broken, damaged or otherwise defective parts shall be repaired or replaced without additional cost to Owner. Work shall be left in a condition satisfactory to Engineer. At completion, carefully clean and adjust all equipment, fixtures and trim installed as part of this work. Systems and equipment shall be left in a satisfactory operating condition.

B. All surplus materials and debris resulting from this work shall be cleaned out and removed from site; this includes surplus excavated material.

3.4 EXCAVATING AND BACKFILLING

A. Excavate and backfill as required for installation of electrical work. Restore all surfaces, roadways, sod, walks, curbs, walls, existing underground installation, etc., cut by installations to original condition in an acceptable manner. Maintain all warning signs, barricades, flares and lanterns as required by the Safety Orders and local ordinances.

B. Excavation: Dig trenches straight and true to line and grade, with bottom clear of any rock points. Minimum conduit depth of pipe crown shall be 24 inches below finished grade.

C. Backfill: Support conduits with 2" sand bedding at bottom of trench. Provide sand backfill from bottom to 12" below finished grade. The top 12" to be local fine earth material free of rubble, rubbish or vegetation. Trenches shall be backfilled and compacted to 90% (per ASTM D1557) of maximum dry density at optimum moisture content in layers not to exceed 6" when compacted.

3.5 PROTECTION

A. In performance of work, protect work from damage. Protect electrical equipment, stored and installed, from dust, water or other damage.

3.6 EQUIPMENT IDENTIFICATION
A. Panelboards, remote control switches, terminal boxes, etc., shall be properly identified with a descriptive nameplate. Nameplate shall be made of 3/32 inch laminated plastic with black background and white letters. Size of letters shall be 1/4 inch high for equipment in device box or boxes 12" or smaller, and 1/2 inch high for panelboard, terminal can, or larger items. Letters shall be machine engraved. Punched strip type nameplates and cardholders in any form are not acceptable. Nameplates shall be attached with oval head machine screws tapped into front panel.


3.7 RUST INHIBITOR

A. Channels, joiners, hangers, straps, clamps, brackets, caps, nuts and bolts and associated parts shall be plated electrolytically with zinc followed immediately thereafter by treating freshly deposited zinc surfaces with chromic acid to obtain a surface which will not form a white deposit on surface for an average of one hundred twenty (120) hours when subjected to a standard salt spray cabinet test, or shall be hot dipped galvanized.

3.8 EQUIPMENT ANCHORAGE

A. Seismic Anchorage of Electrical equipment shall conform to the regulations of 2010 CBC (California Building Code) and ASCE 7-05, sections 13.3, 13.4, and 13.6. All equipment shall be braced or anchored to resist a horizontal force acting in any direction using the following criteria:

1. The total design lateral seismic force shall be determined from section 1614A of 2010 CBC and 13.3 ASCE 7-05. Forces shall be applied in the horizontal directions which results in the most critical loading for design.

2. The value if Ap (component Amplification factor) and Rp (component response modification factor) of section 13.3.1 ASCE 7-05 shall be selected from section 13.6-1 ASCE 7-05. The value of Ip (seismic importance factor) shall be selected from 13.1.3 ASCE 7-05.

Where anchorage details are not shown on the drawings, the field installation shall be subject to the approval of the structural engineer and the field representative of the Office Of The State Architect.

3.9 ARC FLASH

A. Electrical equipment such as switchboards, panelboards, load centers, motor control centers, industrial control panels, meter centers shall be field marked to warn persons of potential electric arc flash hazards per CEC 110.16 and NFPA 70E Standard for Electrical Safety in the workplace. Minimum label wording shall be as follows:

DANGER
Arc Flash and Shock Hazard.
Appropriate PPE Required.
Do not operate controls or open doors without appropriate personal protection equipment. Failure to comply may result in injury or death.

3.10 TEST

A. Test all wiring and connections for continuity and grounds; where such test indicate faulty insulation or other defects, locate, repair and retest. Balance loads at panelboards. Furnish all testing equipment.

3.11 CLOSING OF AN UNINSPECTED WORK

A. Do not allow or cause any of work installed hereunder to be covered up or enclosed before it has been inspected and approved.

B. Should any work be enclosed or covered up before it has been approved, uncover such work and after it has been inspected and approved, make all repairs necessary to restore work of others to conditions in which it was found at time of cutting, all without additional cost to Owner.

3.12 WARRANTY

A. Per Division 0 and 1.

END OF SECTION
SECTION 26 05 00

BASIC MATERIALS AND METHODS

PART 1  GENERAL

1.1  SCOPE

A. The work of this Section consists of basic materials and methods for all work included under Divisions 26, 27 and 28. Additional specifications requirements for electrical work are specified under other sections of Divisions 26, 27 and 28 and where those requirements differ from the requirements of this Section, they shall govern.

1.2  SUBMITTALS

A. Submit product data per Division 0 and 1.

PART 2  PRODUCTS

2.1  CONDUIT

A. Rigid Steel Conduit: Standard weight, mild steel pipe, zinc coated on both inside and outside by a hot dipping or sherardizing process. Inside and outside of conduit shall be finished with a protective coating. All threads galvanized after cutting. Meets UL 6, UL Card #DYIX, and ANSI C80.1.

B. Intermediate Metallic Conduit (IMC): Intermediate weight, mild steel pipe, meeting same requirements for finish and material as rigid steel conduit. Meets UL 1242, UL Card #DYIX, and ANSI C80.6.

C. Electrical Metallic Tubing (EMT): Cold rolled steel tubing, hot-dipped galvanized, with zinc coating on outside and protective lubricating coating on inside. Fittings shall meet same requirements for finish and material as EMT. Meets UL 797 and ANSI C80.3.

D. Flexible Conduit: UL Listed. Flexible steel, zinc coated on both inside and outside by hot dipping or sherardizing process. Liquid-tight conduit shall be galvanized with extruded polyvinyl covering and with watertight connectors, sunlight resistant, direct burial rated. Flexible steel conduit less than 1/2" shall not be used except that 3/8" shall be permitted in lengths not in excess of 6 feet as part of a listed assembly or for tap connections to lighting fixtures as required in CEC Section 410-67(c). Flexible conduit to be one continuous length, no couplings. AFC Liquid-Tuff Type-LFMC and AFC Reduced Wall Flexible Steel Conduit, or equal.

E. PVC Conduit:

1. Type 40, 90°F, UL listed, composed of polyvinyl chloride, conforming to NEMA TC-2, Fed Spec WC1094A, UL651 Standards. Material shall have minimum tensile strength of 6,500 psi at 73.4°F, flexural strength of 12,500 psi and compressive strength of 9,000 psi per ASTM testing. PVC conduit shall be suitable for direct burial without concrete encasement. Fittings shall be of same manufacture. All joints shall be solvent welded.
2. Type 80, similar to type 40 except with extra heavy wall.

3. Only manufactured elbows/bends shall be used. Where field bends have to be made, obtain prior approval by the engineer.

F. Raceway Fittings:

1. Rigid Steel Conduit: Fittings, such as couplings, connectors, condulets, elbows, bends, etc., shall be subject to same requirements as for rigid steel conduit. Couplings and unions shall be threaded type, assembled with anti-corrosion, conductive anti-seize compound at joints made absolutely tight to exclude water. Connectors shall be threaded hubs with bonding insulated metallic bushings. Unions shall be equal to Crouse Hinds UNY or UNF.

2. IMC: Fittings shall be as specified for rigid steel conduit.

3. EMT: Fittings shall be steel, box connectors shall have insulated throat. Connectors and couplings to be compression type.

4. Flexible Metallic Conduit: Connectors to be insulated. Metallic connectors (except for liquid-tight) shall be steel "squeeze" type via a screw, Steel City XC-90X and XC-49X series. Liquid-tight metallic connectors shall be watertight approved for such use.

5. Bushings: Metallic insulated type. Weatherproof or dust-tight installations; liquid-tight with sealing ring and insulated throat, OZ/Gedney type "KR".

6. Expansion and Deflection Fittings: OZ/Gedney, Type "DX" or accepted equal.

7. All box connectors to be insulated throat type.

8. Conduit Straps: Galvanized steel, 2-hole straps. 1-hole straps may be used for conduit sizes 1" and smaller concealed in wall or above ceiling.

9. PVC Conduit: Fittings shall be same grade of material as conduit, solvent welded to conduit.

G. Metallic conduits, raceways, and fittings shall be listed and approved as a grounding means.

2.2 BOXES

A. Galvanized one-piece or welded pressed steel type. Boxes for fixture shall not be less than 4" square and shall be equipped with fixture stud. Boxes shall be at least 1-1/2" deep, 4" square for 1 or 2 gang devices, with plaster rings and gang box with gang cover. Boxes mounted in wall or ceiling finished with gypsum board shall be furnished with 3/4" deep plaster rings. Use screws and not nails to support/secure outlet boxes. Provide blank cover plates for all boxes without devices.

1. 1-gang and 2-gang outlet and junction boxes installed exposed outdoors shall be weatherproof type FS, FD, WS, WD die cast metal or aluminum boxes, Appleton or equal. Plug all unused hubs.
2. Provide 1#12 equipment grounding pigtail at all outlet boxes.

3. Outlet boxes for data, telecommunications, video, and TV outlets shall be 4 11/16" square x 2.125" deep.

4. Outlet boxes containing #8, #6, or #4 AWG wires shall be a minimum 2.125" deep per CEC.

B. Junction boxes located outdoors, or in wet or damp locations shall be rated NEMA-3R, with hinged door and pad-locking tabs.

C. Equipment furnished by other trade but require electrical connection shall be provided with appropriate backbox.

2.3 WIRES

A. Wire shall be copper only, manufactured by General Cable Co., Rome, General Electric Co., or Anaconda. Wire shall be rated 90 degrees C for both dry and wet locations, THWN-2, XHHW-2, or RHW-2 insulation. 90 degrees C THHN may be used in dry and damp locations. Wire installed in high temperature areas, including branch circuits in or above roof insulation or in fluorescent ballast channel, shall have type RHW-2 or XHHW-2 90° insulation.

1. Feeders sized #2 and larger routed below grade, extending beyond or outside the building foundation line shall use types XHHW-2, THW-2, or RHW-2 insulation, 90 degrees C dry and wet rated.

B. Wire shall be Code type copper wire of not less than 98% conductivity. Wires #8 gauge and larger, shall be stranded. Wires shall bear the Underwriters' label, be color coded and be marked with gauge, type and manufacturer's name on 24" centers. Wires smaller than #8 may be solid or stranded. Where stranded wire is used, provide solid pigtail for connection to screw terminals of receptacles, switches, etc.

C. Color Coding to be as follows:

<table>
<thead>
<tr>
<th></th>
<th>208/120 Volts</th>
<th>480/277 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase A</td>
<td>Black</td>
<td>Brown</td>
</tr>
<tr>
<td>Phase B</td>
<td>Red</td>
<td>Orange</td>
</tr>
<tr>
<td>Phase C</td>
<td>Blue</td>
<td>Yellow</td>
</tr>
<tr>
<td>Neutral</td>
<td>White</td>
<td>Natural Grey</td>
</tr>
<tr>
<td>Ground</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

Switch legs shall use the same branch circuit phase color coding which they are connected to. IG ground wire shall be green with yellow tracer.

D. Bring wire to job in original unbroken packages. Obtain approval of inspector or Engineer before installation of wires.

2.4 WALL SWITCHES

A. Wall switches by elevator manufacturer.
2.5 CONVENIENCE OUTLETS

A. Convenience outlets by elevator manufacturer.

2.6 PANELBOARDS

A. Panelboards shall meet NEMA AB-1, PB-1, PB1.1, PB1.2. Panelboards shall be type NQOD, NEHB, I-Line, Power-R-Line, A-Series, and CCB as specified for secondary utilization voltage and phase. As manufactured by Square-D, Cutler-Hammer/Eaton, General Electric, or approved equal. Square-D has been used for design purposes. Busses shall be copper. Provide with neutral buss and copper ground buss. Series rated equipment are not acceptable. Panels shall have full height fully rated bussing.

B. Circuit breakers shall be bolt-on type thermal magnetic, single-pole and multi-pole for branch circuit control with trip-rating permanently marked on the handle. Where trip-rating is not marked on the handle, provide engraved label adjacent to the breaker indicating amperage rating. Multi-pole breakers shall be common trip type with single handle. Factory assembled and listed multi-pole breakers with handle ties shall be acceptable. Bails will not be accepted except where used with multi-wire branch circuits through fluorescent lighting fixtures. All circuit breaker handles shall be equipped with padlocking tabs, "lock-off" device. All circuit breakers shall be fully rated to withstand the available short circuit current as designated on the drawings. Series rated equipment will not be acceptable.

1. Circuit breakers 300 amps and higher shall be solid state type with field adjustable Long-Time and Instantaneous settings and field replaceable trip rating plugs.

C. Enclosures shall be code gauge, galvanized metal with front trim and hinged door with lock masterkeyed. Front trim shall be equipped with concealed trim clamps and concealed door hinges. Enclosures shall be rated NEMA-1 at dry indoor locations, and NEMA-3R where located outdoors in damp or wet locations. Lighting and appliance branch circuit Panelboards shall be maximum 20" wide and 6" deep. Panel trim and cabinet shall be finished ANSI-49 or ANSI-61 gray, except panel cabinets to be recessed are not required to be painted. Surface cabinets shall be without knockouts. Inside door shall have frame for circuit identification card. Fill out card, typewritten, with list of circuits corresponding with the circuit number. Identification shall be specific with room designation, type of load, etc, (i.e., "Classroom 214 receptacles"). For distribution panels, provide engraved laminated labels for load served where identification card is not provided.

D. Panelboard submissions shall include a ladder diagram, physical and electrical data, numbering and trip rating of each circuit breaker. Panelboard shall bear the UL label of approval.

E. Panelboard types as indicated on the drawings shall be the minimum size and type. Provide a larger size and type of panelboard as necessary for the breakers and features/accessories as indicated.

F. Circuit breaker arrangement shall be per the panel schedule.

G. Panel nameplate label shall identify panel, minimum AIC rating, and equipment it is fed from, example as follows, "PANEL-XXX, MAX. 22,000 AIC, FED FROM YYY". Where fed
via a transformer, it shall read, "PANEL-XXX, MAX. 14,000 AIC, FED FROM YYY THRU TRANSF-ZZZ". Label shall be engraved plastic per section 26 00 00. 1/2 inch letters for panel identification.

2.7 SAFETY/DISCONNECT SWITCHES

A. Safety/disconnect switches by modular elevator manufacturer.

2.8 INDIVIDUAL CIRCUIT BREAKERS

A. Circuit breakers shall be molded case thermal magnetic type with trip rating as scheduled on drawings.

1. Circuit breaker trip settings 300 amps and higher shall be solid state type with field adjustable Long-Time and Instantaneous settings and field replaceable trip rating plugs.

2. Circuit breakers with trip settings 1200 amps and higher shall be solid state electronic type with full function trip units including: LTUP, LTD, STPU, STD, Inst PU, Inst OFF, GFPU, GFD.

B. Circuit breakers shall be quick-make, quick-break, trip free operation. The trip-free mechanism shall be independent of manual handle control. All circuit breakers shall be fully rated to withstand the available short circuit current as designated on the drawings. Series rated equipment will not be acceptable.

C. Breakers to be in NEMA-1 (indoor) or NEMA-3R (damp, wet, and outdoor) enclosures. NEMA-3R enclosures shall have the handle concealed behind the cover, and the hinged cover shall be provided with padlocking tabs. Each circuit breaker shall be identified with an engraved, laminated phenolic plate showing the load served or the function of the circuit breaker and trip rating. The nameplate shall be attached with oval head machine screws tapped into the front of the board. Equip breaker handles with padlocking "lock-off" devices.

2.9 PULL LINE

A. Furnish and install pull line in all unused (empty) raceways. Pull lines shall not rot or mildew.

1. Conduits up to 1.5": 1/8" diameter braided line of polypropylene with 200 lbs. tensile strength, IDEAL, Jet-Line #232, or equal.

2. Conduits 2' or larger: 3/16" polypropylene pull rope with 800 lbs. tensile strength, IDEAL Pro-Pull or equal.

B. Provide pull line in conduits for utility company systems, size and type per their requirements.

2.10 COVER PLATES
A. Switch and receptacle cover plates shall be smooth nylon type. Cover plates for other devices/outlets such as data, telephone, television, etc. shall be nylon. Cover plate color shall be ivory, matching all systems.

B. Each receptacle shall have its circuit identification on the cover plate (i.e., "LA1-12"). Use typewritten "clear tape". Use black letters/numbers. Clean surface before adhesive tape is applied, and wrap tape around each end to prevent pealing.

1. For floor boxes, plates shall be engraved with circuit identification.

PART 3 EXECUTION

3.1 CONDUITS

A. All conduits shall be rigid steel or IMC except EMT may be used at following locations:

1. In dry locations in concealed furred spaces.

2. In partitions other than concrete, concrete block, or solid masonry.

3. For exposed work indoors and outdoors above 10 ft. except:

a. In special locations prohibited by Code, such as hazardous locations, rigid steel shall be used.

b. Conduits exposed on/above the roof shall be rigid steel up to 10 ft above roof surface.

c. Conduits exposed in Gymnasiums and Multi-Purpose Rooms shall be rigid steel up to 25 ft.

4. Concealed above suspended ceilings or ceilings directly attached to structure above.

B. Flexible conduit shall be used to provide flexible connections of short length (3 ft or less) to equipment subject to vibration or movement and to all motors. Up to 6 ft is allowed where additional flexibility is needed. Provide a separate bonding conductor in all flexible connections/conduit. Flexible conduit shall be one continuous length without couplings.

C. Run conduit concealed in areas having finished ceilings and in walls. Run all cross conduits and vertical risers or drops concealed in wall and/or partitions. Should it be necessary to notch any framing members, make such notching only at locations and in a manner as approved by the Architects. Where concealing conduit is not possible or practical, conduit may be run exposed in areas only where so permitted by the Architect. Install exposed conduit run neatly, parallel to or at right angles to structural members. Maintain a minimum of 6" clearance from steam or hot water pipes.

D. Support conduit with straps and secure to wood structure by means of bolts or lag screws, to concrete by means of insert or expansion bolts, to brickwork by means of expansion bolts, and to hollow masonry by means of toggle bolts. Expanders and shields shall be steel or malleable iron.
E. Do not install in concrete slabs.

F. Conduits installed in contact with ground shall be PVC-40 conduit.

1. Provide a minimum 2" of sand bedding at the bottom of the trench before laying conduits. Maintain 2" separation between conduits. Maintain 12" separation between power conduits (120 Volts and greater) and low voltage signal conduits.

2. Backfill shall be sand, from bottom to 12" below finished grade. Fine earth native backfill to be used for the last 12".

3. Risers, including elbows, shall be double-wrapped rigid steel or PVC coated rigid steel conduit; except that risers, including elbows and bends, at in-ground pull box locations shall be PVC-40 terminated with end bells.

4. When installing underground conduits to specified depth, depth shall be taken from the top of the conduit to the finished grade level. Unless otherwise specified, underground conduits outside of foundation line shall be installed with top side not less than 24" below finished grade.
   a. Conduits 1.5" and larger inside foundation line shall be below subgrade.
   b. Conduits 1.25" and smaller inside foundation line shall be installed on the subgrade, only one conduit high. Conduits shall cross under subgrade. Secure conduit to subgrade to prevent "floating".
   c. Backfill material within foundation line shall be sand.

5. The minimum size of conduits outside the foundation line shall be 1", 3/4" inside the foundation line.

6. Bends shall be wide sweeping type with minimum 24 inch radius bends.

7. Manufactured elbows are required to be used for all 22.5 and 45 degree bends, and 90 degree elbows, and combinations thereof. Field bends may be used for other bends with approved field benders specifically for such purpose and such bends shall not compromise the integrity and nominal thickness of the conduit wall.

8. For all trenches, provide a 6" wide non-biodegradable metal-detectable polyethylene tape at 12" below grade, 5-mil thick, labeled "CAUTION ELECTRIC LINE BURIED BELOW". Fluorescent red for electric power conduits and fluorescent orange "TELECOMMUNICATIONS" for telephone and signal conduits. Use fluorescent red for common trenches. Tape shall be continuous for full length of trench.

G. Support individual conduits with 2-hole steel straps. 1-hole steel straps may be used for conduits 1" and smaller concealed in wall or above ceilings.

H. Galvanized iron hanger rods sizes 1/4" diameter and larger with spring steel fasteners, clips or clamps specifically designed for purpose for conduits up to 1" size may be used.
I. Individual conduits 3/4" and smaller run above wire suspended ceilings may be supported from independent hanger wires with approved spring steel clips. Wire ties will not be acceptable. Wire shall be taut and secured to ceiling and structure above.

J. Support multi-parallel horizontal conduit runs with trapeze type hangers consisting of two or more steel hanger rods, cross channels, J-bolts, clamps, etc.

K. Sizes of rods and cross channels shall be designed to support four times actual load. Hanger rods shall have safety factor of 5 based on ultimate strength of material used.

L. Conduits for telecommunications, multi-pair cables shall have a minimum inside bend radius per CEC Table 346-10 (do not use exception).

M. After installation of conductors, all conduits routed below grade shall be sealed at each opening, including risers and in pull boxes, to prevent the entrance of water and debris.

N. Conduits not terminated into a box or cabinet, such as stubbed to a backboard, shall be terminated with an insulated bushing. Bushings for metallic conduits shall be metallic type secured by set screw, compression, or threaded type. Bushings for PVC conduits shall be glued in place.

O. Although circuiting is shown as diagrammatic, their point-to-point destinations and their indication of above/below ground route shall be followed as much as possible. Where site conditions dictate that an alternate means of routing will alleviate conflicts, the alternate means will be considered with prior approval by the Engineer.

P. Horizontal runs of conduit above suspended wire lay-in ceilings shall not be less than 12" above the ceiling.

Q. Maintain 12 inch separation between power circuits (>120V) and all signal circuits (data, telephone, speaker, clock, etc.) to prevent interference.

R. Feeder conduits connected to panels/switchboard shall have ground lug bushing connected to equipment ground buss with ground wire same size as largest ground wire in the panel/switchboard.

S. Conduits penetrating through the roof shall be secured within 12" below roof and supported within 12" of the penetration on the roof.

T. Where conduits cross building expansion/seismic joints provide a short length of flexible conduit (do not exceed 6 ft.) and fittings listed as a grounding means, or in locations where flex conduit cannot be used provide UL listed expansion/seismic fittings.

U. Conduits to air conditioning (AC) equipment, fans, or other roof mounted equipment shall rise up from the ceiling below through the equipment curb or conduit window within the equipment, if allowed by equipment manufacturer, to prevent additional roof penetrations.

V. Where conduit passes through finished walls or ceilings, provide steel escutcheon plates, chrome or painted as directed. Conduit which penetrate floor slabs, concrete or masonry walls shall be grouted and sealed watertight at penetrations.
W. For 20-amp 120 or 277 Volt Circuits:

1. Do not install more than six (6) circuits in any conduit.

2. Do not install more than seven (7) current carrying conductors in any conduit.

3. Where using #10 AWG wires to allow for conductor derating:
   a. Do not install more than twelve (12) circuits in any conduit.
   b. Do not install more than twelve (12) current carrying conductors in any conduit.

X. Cables and Raceways installed under metal-corrugated sheet roof decking shall maintain a minimum 1.5" from the nearest surface of the roof decking per CEC. This shall not apply to RMC or IMC.

3.2 FLASHING

A. Make conduit projecting through roof watertight by proper flashing. Secure a sheet lead cap with a tightening bend to conduit. Use two collars for tar or asphalt composition roofings. Set one collar directly on roof deck and second collar set over on top of roofing felts. Lead sheet flashing shall be made of 4 lb. sheet lead.

3.3 PENETRATIONS OF FIRE RESISTIVE WALLS AND PARTITIONS

A. Penetrations of protected openings (fire rated walls, ceilings, floor-ceilings, roofs, etc.) shall be protected in accordance with the California Building Code, Part 2, Chapter 7, Title 24. Penetrations shall apply to conduits (raceways), cable trays, boxes, cabinets, panels, cables, etc.

B. Fire stopping shall be provided at penetrations of fire resistive walls, floors, ceilings, floor-ceiling assemblies, and roofs. Fire-stopping shall have a "F" and/or "T" rating as determined by tests conducted in accordance with ASTM E 814 or UL-1479. Fire stopping system/materials shall be UL Listed.

3.4 BOXES

A. Nails shall not be used to support outlet boxes. Boxes must be accurately placed for finish, independently and securely supported by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers. For metal stud construction, use metal box hangers only. Box hangers shall be securely tied or welded (where permitted) or screwed to metal studs. Paint weld with rust inhibitor. Boxes installed in masonry tile or concrete block construction shall be secured with auxiliary plates, bars or clips and be grouted in place.

1. Outlet Boxes with Receptacles or Switches: Provide a solid pigtail (green) ground wire grounded to the metallic outlet box. Pigtail shall also ground device and separate ground conductor if available. Size of ground wire to match overcurrent protection.
B. Locate outlets at the following heights above floor to the center of the device or handle unless otherwise noted on Drawings or in Specifications.

1. Telephone Outlets: 18" (45" for wall phone).

2. Refer to elevations and details on Architectural Drawings for exact heights and locations of all electrical outlets for switches, receptacles, special equipment, etc. Where above heights do not suit building construction or finish, consult Architect.

C. Install pull boxes or junction boxes as required in accessible spaces but do not install in finished areas unless approved by Architect.

D. Where fire rated construction is required (refer to Architectural Drawings), do not locate electrical outlet boxes back-to-back. Provide a minimum of 24" horizontal separation between outlet boxes on opposite side of the same wall. Where such restrictions cannot be met, provide fire-stopping around box such as 3M Moldable Putty Pads or equal.

E. Boxes up to 100 cubic inches located in suspended wire ceilings may be supported through an independent hanger wire with approved tension clips. Wire shall be taut. Secure wire to the structure above and the ceiling below.

3.5 CONDUCTORS

A. Splices and joints for #10 AWG or smaller wiring shall be twisted together electrically and mechanically strong and insulated with approved type insulated electrical spring connectors, Scotchlok or Ideal. Joints and connections for #8 AWG or larger shall be made with Burndy, T & B, or approved equal, solderless tool applied pressure lugs and connectors. Uninsulated lugs and wire ends shall be insulated with layers of plastic tape equal to insulation of wire and with all irregular surfaces properly padded with "Scotchfil' putty prior to application of tape. Tape shall be equal to Scotch #33, General Electric #AW-1, or approved equal. Feeder splicing is not permitted.

1. In special instances where feeder splicing is allowed by the Engineer, it shall be made with high compression sleeve type connector followed by manufactured splicing kit utilizing as insulators, resins poured into a ready-to-use plastic mold to provide a uniform, moisture-proof tough, impact-resistant insulation.

2. Conductor splices below grade shall meet ANSI C119.1-1986 and UL 486D Standards. Raychem WCSM or FCSM heavy wall heat shrink tubing; or RVS or RVC series if use of flame heat is prohibited. Conductors to be joined with compression sleeve connectors.

B. Use only UL approved wire pulling compound as lubricant.

C. Lace conductors together with waxed linen lacing cord, T & B "Ty-Rap", Holub "Quik-Wrap" or equal, in a neat and workmanlike manner in panelboards, wireways, raceways, pull boxes and similar locations.

D. #12 AWG wire shall be minimum size wire used for lighting and power circuits.
E. Provide cable supports in risers by means of a clamping device with insulated wedges or "Kellem" grips.

F. All conductors shall be in conduit unless otherwise indicated.

G. Conduit sizes shall be based on code fill table for THW insulated wires to accommodate the number, size, and type of wires shown or specified.

H. Wiring installed in pull boxes or junction boxes, where wire is pulled through without terminations (except splices), shall have a service loop around the interior of the box for 360 degrees utilizing the largest circumference.

I. Use #10 AWG conductor for 20 Amp 120 Volt circuit home runs longer than 75 feet, and for 20 Amp 277 Volt circuit homeruns longer than 200 feet.

J. Where conductors are increased in size and number (such as for voltage drop reasons), such that conductors will not fit the standard breaker or panel lugs, terminate conductors in one of the following means:

1. Provide larger breaker frame or panelboard.

2. Provide oversized lugs.

3. Last Option only with Approval from Engineer: Terminate wires in multiport connector and provide pigtail. Splice to be made in panel or switchboard if space is available, or in separate splice box. This option will not be normally granted.

3.6 GROUNDING

A. Grounding and ground bonding of the electrical installation shall be in accordance with CEC Article 250, and any applicable codes. Ground fittings shall be approved manufactured type, installed and connected to conform with Code requirements.

B. Neutral conductors and noncurrent-carrying parts of equipment at each installation shall be grounded in accordance with applicable code. Ground conductor shall be copper having a current capacity sized in accordance with CEC.

C. All equipment cases, motor frames, etc., shall be completely grounded to satisfy requirements of CEC. Install bond wire in flexible conduit. Install copper bond wire, sized in accordance with CEC, in all nonmetallic raceways and bond to all metallic parts using approved fittings.

D. All connections shall be made with solderless connectors or molded fusion-welding process.

E. Equipment grounding conductors shall be insulated with a continuous green outer finish along its entire length. Conductors size #4 AWG and larger may be identified (with green electrical tape applied half-lapped) at each end and at every point where the conductor is accessible. Tape shall be applied from its point of entry to point of exit or termination.
F. Insulated grounded (neutral) conductors shall be identified with a continuous white outer finish along its entire length. Neutral conductors #4 AWG or larger can be identified by a distinctive white marking (applied half-lapped with white electrical tape) for the last 12 inches at each end.

3.7 FIELD TESTS

A. General: Perform field test in the presence of the Owner's Representative except as otherwise specified. Provide required labor, materials, equipment and connections to perform tests. Document results and submit them to the Owner's Representative. Repair or replace all defective work.

B. Perform Insulation Resistance (IR) "Megger" Testing per NETA Standards. Submit test results. Provide testing for:

1. All feeders 100 Amps and higher.
2. Branch circuits 100 Amps and higher.

C. Verify operation of starters and install overload protection devices sized in accordance with the motor full load current.

3.8 CIRCUIT BREAKER COORDINATION

A. Provide protective device (fuses and breakers) coordination study on the distribution system to determine circuit breaker settings for electronic breakers and other breakers with adjustable tripping characteristics, and all protective devices 300 amps or more. The coordination shall be with the immediate downstream and upstream protective device(s).

B. Plot time-current characteristics of the specified protective devices using log-log paper. Include the following minimum information, as pertinent to system, on plots:

1. Complete titles.
2. Representation One Line Diagram and legends.
3. Power company's relays or fuse characteristics.
4. Complete operating bands of low voltage circuit breaker trip curves.
5. Fuse curves.
6. Protective relay type selected and curves.

Maintain reasonable coordination intervals and separation of characteristic curves on plots. Provide sufficient curves to clearly indicate the coordination achieved to the main breaker, feeder breakers and load protective devices rated 300 amperes or more.

C. Summarized the results of the power system study in a bound final report. Organize the report using the following sections:

1. Description, purpose, basis, written scope, and a single-line diagram of the portion of the power system which is included within the scope of study.

2. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
3. Provide a separate tabulated list for the selection and settings of the protective devices. Include the following minimum information:

   b. IEEE device number. (Where applicable)
   c. Manufacturer, device type and range of adjustment.
   d. Recommended settings.

3.9 CLEANING

   A. Brush and clean work prior to concealing, painting and acceptance. Performed in stages if directed.

   B. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.

   C. Remove debris from inside and outside of material, equipment and structures.

3.10 WARRANTY

   A. Per Division 0 and 1.

END OF SECTION
SECTION 26 50 00

LIGHTING

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Furnish and install a complete lighting system consisting of compact fluorescent and fluorescent luminaires, lamps, ballasts, automatic wall switches, occupancy sensors, and appurtenances as shown on drawings and specified.

1.2  WORK INCLUDED

A. The requirements of Sections 26 00 00 and 26 05 00 shall apply to the Work of this Section.

1.3  QUALITY ASSURANCE

A. All materials shall comply with applicable standards of the Underwriter’s Laboratories, Inc.

1.4  SUBMITTALS

A. Per Division 0 and 1.

PART 2  PRODUCTS

2.1  BALLASTS

A. Electronic Fluorescent Ballasts (T8 lamps):

1. Lamp Frequency: >40 kHz.

2. 120/277 Dual Voltage or Single Voltage.


4. Circuit Type: Parallel

5. High Power Factor: >98%.


7. Low THD: <10%.

8. Normal Ballast Factor (NBF) of 0.88, Low Ballast Factor (LBF) of 0.78. All ballasts shall have Normal Ballast Factor unless otherwise noted on the plans.

9. Ballasts shall operate lamps with no visible flicker (<5% flicker index).
10. UL Listed Class P, Type 1 Outdoor, CSA Certified, 70 deg-C maximum case temperature, 75 deg-C maximum case temp (4-lamp model), FCC 47CFR Part 18 Non-Consumer, Class-A Sound Rating, ANSI C62.41 Cat. A Transient Protection.

11. Minimum Starting Temperature: 50°F (indoor), 0°F (outdoor).

12. Manufacturers: OSRAM Sylvania, G.E., Motorola or equal.

13. Based on F32T8 lamps with initial lamp lumens of 2850, ballast and lamp performance shall be as follows. A 2.5% tolerance is acceptable.

<table>
<thead>
<tr>
<th>No. of Lamps</th>
<th>Ballast Factor</th>
<th>System Lumens</th>
<th>System Watts</th>
<th>System Eff(lum/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-F32T8</td>
<td>0.88</td>
<td>5015</td>
<td>55</td>
<td>91</td>
</tr>
</tbody>
</table>

B. Compact Fluorescent Electronic Ballasts: Ballasts to be Series Type, Programmed Rapid-Start, Lamp Frequency >40 kHz, Lamp CCF <1.7, Starting Temp minimum -5 deg-F, Low THD <10%, HPF >95%, 120/277 Dual Voltage, UL Listed Class-P Type-1 Outdoor, FCC 47CFR Part-18 Non-Consumer, Sound Rating-A, ANSI Cat.-A Transient Protection, Dynamic End-of-Lamp Sensing. Performance to be as follows. A 2.5% tolerance is acceptable.

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>No. of Lamps</th>
<th>Ballast Factor</th>
<th>System Lumens</th>
<th>Input Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>F18</td>
<td>1</td>
<td>1.00</td>
<td>1200</td>
<td>20</td>
</tr>
</tbody>
</table>

2.2 LAMPS

A. Provide lamps, of wattage and type as shown on the drawings, for all fixtures. Lamps shall be OSRAM Sylvania, G.E., or Philips.

B. Fluorescent Lamps:

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Initial Lumens</th>
<th>Min CRI</th>
<th>Rated Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>F18CFL</td>
<td>1250</td>
<td>82</td>
<td>12k</td>
</tr>
<tr>
<td>F32T8</td>
<td>2850</td>
<td>78</td>
<td>24k</td>
</tr>
</tbody>
</table>

1. Unless otherwise indicated on the drawings, color temperature (CCT) to be 4100K, Cool White, (CW) SP41, SPX41.

2. Fluorescent lamps shall pass the U.S. Federal EPA Toxicity Characteristic Leaching Procedure (TCLP) and shall have green lamp etches or green component materials used in the lamp for identification as TCLP compliant.

C. Compact fluorescent lamps shall have end of life shutdown.

2.3 LUMINAIRES

A. Weatherproof fixtures shall have neoprene gaskets on fixture trim and door assemblies. Fixture shall be UL listed for wet locations.
B. Luminaire voltage indicated on the plans is for reference. Verify actual voltage required based on the branch circuit.

C. Housing shall be prefinished. Color to be selected by Engineer.

D. Verify fixture mounting to ceiling type. Fixture shall be compatible with the ceiling type.

2.4 WIRING

A. Fixtures shall be wired with conductors having insulation suitable for the environmental conditions, current, voltage, and temperature to which the conductors are subjected.

B. 120/208 Volt Luminaire: 300 Volt, type AF, HFF, KFF, SFF, ZFF, or equal, beginning at separately mounted outlet box.

2.5 DISCONNECTING MEANS

A. Indoor fluorescent light fixtures utilizing double-ended lamps and containing ballasts or having ballasts shall be provided with an internal or external disconnecting means to disconnect all supply conductors to the ballast including the grounded conductor if any. Disconnecting means shall meet 2010 CEC 410.130(G).

PART 3 EXECUTION

3.1 INSTALLATION

A. Refer to reflected ceiling drawings; coordinate therewith for ceiling fixture installations throughout building. Luminaires shall be adequately mounted, wired, tested and left in an operating condition, complete with lamps, wattage as shown.

B. All dirt, plaster, paint, etc., on luminaires and lenses shall be removed before work will be accepted. Mounting of luminaires shall be in strict accordance the CEC Section 410.

C. Report changes in outlet locations of luminaires found necessary due to interference with structure, pipes, ducts, etc., to Architect for approval before installation. Luminaires specified with overall lengths are subject to change. Check job conditions; adjust as directed.

3.2 WARRANTY

A. Per Division 0 and 1.

END OF SECTION
SECTION 27 13 20

DATA COMMUNICATIONS SYSTEM

PART 1  GENERAL

1.1  SCOPE OF WORK

A. Furnish and install a complete data communications system. The system shall consist of but not limited to cables (fiber optic and twisted-pair copper), innerduct, patch panels, fiber interconnect equipment, connectors (fiber and copper), wiring blocks and telecommunications outlets and any other equipment and accessories as required. The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context "good quality" means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

B. All fiber strands shall be terminated with connectors and landed on the fiber interconnect equipment. All copper station cables shall be terminated on patch panels (IDF/MDF end) and data communications outlets (work station end).

1.2  RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to work specified in this Section.

B. Sections 26 00 00, 26 05 00, 27 05 50.

C. Applicable Standards:

1. ANSI/TIA/EIA-569-A, Commercial Building Standard for Telecommunications Pathways and Spaces.


3. ANSI/TIA/EIA-568-B.2, Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.


6. EIA/TIA-455-61, FOTP-61, Measurement of Fiber or Cable Attenuation Using An OTDR.

7. IEEE 802.3, Carrier Sense Multiple Access With Collision Detection.

8. CEC Articles 770 and 800.

1.3  CONTRACTOR QUALIFICATIONS
In order to qualify for installation of the data communications system, Contractor must possess the required license classification, a performance history, experience in the installation and termination of fiber optics cable systems, certification from cabling manufacturer, and proof of time in business.

A. License Classification: Contractor must possess a valid C-7 California State Contractor's License. This license must have been issued two years prior to the date of this bid. No other license classification is acceptable.

B. Performance History: Contractor must have successfully performed at least three projects of similar scope, within two years of the date of this bid. Proof of performance shall be in the form of reference sheets which shall include a brief description of the project, the beginning and ending contract price, the project foreman or superintendent's name, and the name, address, and telephone number of a project contact.

C. Fiber Optics Experience: Contractor must be able to prove to the satisfaction of Owner that it has significant experience in the installation of fiber optics cable systems. Installation must include installation of fiber optics cable, fiber termination, a knowledge of interconnect equipment, and a thorough knowledge of testing procedures. Contractor must provide a minimum of 3 references supporting its claim of experience for similar projects within the 2 years prior to this bid. Documentation must be included with the bid documents submitted.

D. Certification From Cabling Manufacturer: Contractor must be able to prove to the satisfaction of the Owner via a certificate that certification in copper and fiber optic product installation has been granted and is current.

E. Time In Business: Contractor must have been in business and in the business of installing telecommunications systems, continuously, for a period of at least three years, prior to the date of this bid. Contractor must submit at least one project reference for each of the of the three years prior to the date of this bid. These project references shall contain the same information required in Paragraph B above. Contractor must also provide a list of key installation personnel, their hire dates, and a resume of their experience. Key installation personnel shall include at least one foreman and two journey level installers or technicians. By submitting the names of these personnel, Contractor is committing them to the execution of the project outlined in this specification.

1.4 DEFINITIONS

A. Main Distribution Facility (MDF): The MDF is the location, within a building or complex of buildings, where the entire telecommunications system originates. It may include: The physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and equipment racks. ANSI/TIA/EIA-569-A refers to the room housing the MDF as the "Equipment Room".

B. Intermediate Distribution Facility (IDF): The IDF is the location in a building where a transition between the backbone or vertical riser system and the horizontal distribution system occurs. It may include: The physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and equipment racks. The IDFs provide the interface location between fiber distribution cable (backbone) and station cable (horizontal distribution).
C. Backbone Pathway: The Backbone Pathway consists of a series of conduits or chases which connect the MDF to IDFs or IDFs to IDFs. It generally houses the vertical or backbone system.

D. Backboard: Backboard generally refers to the plywood sheeting lining the walls of telecommunications facilities. Backboard may also refer to the entire wall-mounted assembly, including wire management, wiring blocks, and equipment racks. In this case, the term Backboard is fully interchangeable with SBB or TTB and the equipment required to fulfill the Scope of Work below.

1.5 SYSTEM DESCRIPTION

A. The data communications system shall consist of active hub equipment, a fiber optics backbone and twisted pair copper work station cabling. The central location shall house an MDF and each of the other locations shall house an IDF. Each fiber optics cable shall originate in the MDF and shall be terminated in its respective IDF. All fiber optics cables shall be enclosed in innerduct which shall be routed through a system of conduits and raceways. From each IDF one or more twisted-pair copper cables shall be routed to each data outlet location. These cables shall originate in an IDF and terminate in its respective data outlet location. The MDF and each IDF will house active data distribution equipment including but not limited to fiber hubs, data terminal controllers, local area network hubs, fiber optic transceivers, routers, and DSU/CSU devices. Unless specifically noted, active equipment is not within the scope of the work.

1.6 MANUFACTURER

A. Throughout this specification, manufacturers are cited, along with specific part numbers. These citations are for the purpose of establishing quality and performance criteria.

1.7 SUBMITTALS AND SUBSTITUTIONS

A. The submission shall consist of five (5) major sections with each section separated with insertable index tabs.

1. 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. Each page in the submission shall be numbered chronologically and shall be summarized in the index.

2. The second section shall include a copy of the Contractor's valid C-7 California State Contractor's License, the information required in Section 1.02 above, and a list of instrumentation to be used for system testing.

3. The third section shall contain a table of contents with product literature including cut sheets and specification sheets.

4. The fourth section shall contain samples of proposed cable markers and labeling.

5. The fifth section shall contain a complete shop drawings, point-to-point wiring, device/outlet locations, rack elevation showing all major equipment such as patch panels and fiber interconnect equipment, detailed satellite closet count, and bill-of-materials.
B. For purposes of determining equality, technical and general information set forth on the respective data sheets by manufacturers named for each specified item shall be considered as part of these specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality. The Owner reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by and a copy of the test results by an independent testing laboratory to prove equality. The decision of the Owner regarding equality of proposed equal items will be final.

1.8 FUNCTION AND OPERATION

A. The intended function of the data communications cable system is to transmit data signals from a central location to several individual data outlet locations.

B. The multimode fiber optics cable system shall be capable of transmitting signals with a bandwidth per the performance parameters of the specified cable. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable, shall be no more than the manufacturer's stated dB loss based on cable length and 0.6 dB loss for each connector assembly.

C. Work station cable, commencing at the wiring blocks, shall be installed in accordance with ANSI/TIA/EIA-568-B.1 standard and shall be capable of transmitting a signal at 155 MBPS with acceptable performance in accordance with Category-6 performance requirements as specified in ANSI/TIA/EIA-568-B.2-1. The entire work station cable system, including wiring blocks, cable, and telecommunications outlets shall be tested for Category-6 compliance.

PART 2 PRODUCT AND INSTALLATION

2.1 GENERAL

A. Equipment shall be installed in accordance with the drawings and the manufacturer's requirements. General installation provisions are as follows:

1. Equipment Racks: Each rack shall be mounted such that the side rails are plumb. Each rack shall be affixed to the backboard at each of the mounting holes provided. Attachment shall be by 1/2" x 1-1/4" lag bolts. A 3/8" pilot hole shall be drilled for each lag bolt.

2. Wiring Blocks and Wire Management Components: Where required, wiring blocks and wire management components shall be mounted to the plywood backboard. Each device shall be mounted such that its horizontal dimension is level. In cases where more than one device is mounted, they shall be aligned vertically. Each device shall be affixed to the plywood backboard by means of screws suitable for fastening to plywood. A minimum of four (4) of the mounting holes provided shall be utilized for fastening.

3. Fiber and Copper Cable: Where fiber or copper cable enters an MDF or IDF it shall be affixed to the backboard via "D" Rings and cable ties in accordance with the attached drawings. All cable shall be neatly bundled, combed, and tied. All cable runs, within the MDF or IDF shall be horizontal or vertical within the constraints of minimum cable bending radii.
4. Fiber Optics Interconnect Equipment: Interconnect equipment may be mounted either on the plywood backboard or in the equipment racks, depending on the particular application and as noted on the drawings. When mounted on the backboard, the horizontal dimension shall be level. A minimum of four (4) of the mounting holes provided shall be utilized for fastening. Screws shall be tightened to the extent that they hold the device snug to the backboard, but not so tight as to distort or damage the device. Interconnect equipment mounted in racks shall be affixed to the rack by at least four (4) screws. The screws shall be of the correct size and thread configuration for the holes in the rack.

5. Labeling: Hand written labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8") in height, block characters, and legible. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the font color shall contrast with the background. Patch panels shall exhibit workstation numbers, in sequential order, for all workstations served by the MDF or IDF.

Each fiber optics cable segment shall be labeled at each end with its respective IDF identifier. Each fiber interconnect device shall be labeled with its respective IDF identifier. Each telecommunications outlet shall be labeled with its respective work station number (machine labels only).

6. Warning Tags: At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE". The text shall be, permanent, black, block characters, and at least 3/16" high. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not less than five (5) feet. Any section of exposed cable which is less than five (5) feet in length shall have at least one warning tag affixed to it. Cables shall be tagged in pull boxes and at all locations not in conduit.

2.2 FIBER INNERDUCT

A. Description: From the MDF to each IDF segments of fiber optics innerduct shall be installed in the conduit system.

1. Product: Carlon or equal, minimum 1.25" OSP fiber optic cable innerduct, orange, corrugated, routed in conduit, with all necessary accessories.

2. Quantities Required: Innerduct runs do not have to be continuous throughout, breaks are expected at the pull boxes. Contractor is responsible for determination of actual lengths of innerduct required. Enough innerduct shall be provided and installed to extend from the fiber service loop in the MDF to the fiber service loop in each IDF. If the route passes through a pull box, the segments of innerduct shall extend twelve inches into the pull box. If the route passes through an enroute IDF, each segment of innerduct shall extend at least twelve inches beyond the end of the service conduit.

B. Installation: Fiber innerduct shall be installed in accordance with manufacturers instructions and industry standards. Within the equipment rooms, the innerduct shall extend from the end of conduit to four (4) feet above the floor and shall be affixed to the backboard by
means of clamps designed for that purpose. Care shall be taken to avoid kinking the innerduct or applying excessive tension during the installation process.

2.3 FIBER DISTRIBUTION

A. Description: From the MDF to each IDF a continuous segment of fiber cable shall be installed. Routing shall be via conduit in accordance with electrical site drawings. Through each conduit section, the cable shall be housed in a 1-1/4" innerduct, care being taken not to exceed CEC specifications regarding conduit fill. The cable shall be suitable for subsurface installation. The cable shall not extend more than fifty (50) feet into the building interior unless enclosed in conduit.

B. Fiber Optic Cables:

1. 50 micron Multimode (MM) Fiber Parameters:
   a. Fiber Size: 50.0/125/250 micron (core/clad/coating/)
   b. Numerical Aperture: 0.200
   c. Maximum attenuation dB/km at 850/1300 nm: 3.5/1.5.
   d. Minimum LED bandwidth MHz-km at 850/1300 nm: 500/500.
   e. Meets FDDI optical specifications and IBM 3044 channel extender.
   f. Gigabit Ethernet distance guaranteed to 600/600 meters at 850/1300 nm respectively.
   g. 10 Gigabit Ethernet distance guaranteed to 82/- meters at 850/1300 nm respectively.

Fiber cables shall be Corning FREEDM or ALTOS All-Dielectric Loose Tube Cables, CommScope 8H and 5H cables, or equal. Strand count as indicated on plans (Provide with 12-strand MM cables where no strand count indicated). Cable construction shall consist of a central dielectric strength member, fiber in loose buffer tubes, surrounded by water blocking material, rip cord, dielectric strength member all around and a PE outer jacket.

2. Building Cable Parameters:
   a. Tight buffered non-conductive.
   b. OFNR or OFNP rated.
   c. Utilizes 900 micron TBII buffered fibers.

Fiber cables shall be Siecor MIC Cables, CommScope 8H (SM) and 5H (MM), or equal. Strand count as indicated on plans (Provide 12-strand MM cables where no strand count indicated).

C. Connectors: Connectors shall be 568LC type meeting ANSI/TIA/EIA-568-B and JIS specification, premium ceramic ferrule with composite housing, typical insertion loss of 0.2 dB, durability of \( \leq 0.2 \) dB change at 500 matings, tensile strength of \( \leq 0.2 \) dB change at 20 lbs., temperature cycling of \( \leq 0.3 \) dB change from -40°C to +75°C for 40 cycles. Siecor, Leviton, AT&T or equal.

D. Fan-Out Kits: For termination of loose tube fiber cables. For buffer tube sizes of 2.4mm or 3.0mm, Siecor FAN-BTXX-XX series or Leviton 49887 series. Provide fan-out kits for
terminating all fibers.

E. Installation: Installation shall be conducted following guidelines established by the product manufacturer and industry standards.

1. Fiber Optic Cable: During installation of the fiber optic cable segments into the conduit system, special care shall be taken to avoid damage to the cable. While under pulling tension, the cable shall not be bent into a curve with a radius of less than twenty (20) times the cable diameter. Pulling tension shall not exceed manufacturer’s recommended maximum tensile load. Contractor shall utilize a winch with tension control or a "break-away" link designed to break away at or below the recommended maximum tension.

The fiber optic cable shall be routed through the conduit and onto the appropriate IDF backboard. Routing on the backboard shall be straight and plumb. A minimum ten (10) foot service loop shall be provided at each terminal location.

2.4 TESTING AND DOCUMENTATION

A. Testing: Contractor shall test each multimode and single mode (where terminated) fiber strand and each pair of each twisted-pair copper cable. The Owner reserves the right to have a representative present during all or a portion of the testing process. If the Owner elects to be present during testing, test results will only be acceptable when conducted in the presence of the Owner.

1. Fiber Optics Cable: Each fiber strand shall undergo bi-directional testing for signal strength. In addition, one fiber of each cable shall be tested using an OTDR to verify length and continuity.

   a. Test Equipment: Multimode: Siecor OM-100F and OS-100D or equivalent. OTDR test equipment.

   b. Tests: Multimode Bi-directional signal attenuation at 850 and 1300 nm. Singlemode bi-directional signal attenuation testing at 1310 and 1550 nm, only if required to be terminated.

   c. Test Criteria: Signal loss of for each fiber shall not be more than the loss summation due to cable length and 0.5 dB loss per connection assembly (Connector-to-connector) or 0.25 dB loss per connector, and 0.10 dB loss for each splice. Identify actual loss based on testing and calculated loss on test form. The tested loss (TL) shall be lower than the calculated loss (CL). The owner reserves the right to have fiber cables replaced and retested if the TL exceeds the CL.

B. Documentation: Contractor shall provide documentation to include test results and as-built drawings.

1. Fiber Test Results: Furnish test results of the fiber testing. Hand written results are acceptable provided the text is neat and legible. Copies of test results are not acceptable. Only original signed copies will be acceptable.

2. As-Built Drawings: Provide reproducible vellum as-builts, full size indicating each outlet
2.5 ACCEPTANCE

A. Acceptance of the Data Communications System, by Owner, shall be based on the results of testing, functionality, and the receipt of documentation. With regard to testing, all fiber segments and all workstation data cables must meet the criteria established. With regard to functionality, Contractor must demonstrate to Owner that specified data signals can be successfully transmitted, bi-directionally, from the MDF/IDF to and from some number of individual data outlets. The number of outlet locations to be tested shall be determined by Owner. With regard to documentation, all required documentation shall be submitted to Owner.

PART 3 EXECUTION

3.1 DIVISION OF WORK

A. Contractor shall install the data communications system as described in the preceding. Installation shall result in a functional system. The Scope of Work includes:

1. All necessary conduit and raceway.

2. Necessary trenching, backfill, replacement of landscape material, repair of damage to utilities or structures, replacement of asphalt and base, and replacement or repair to concrete flat work incidental to conduit or raceway installation.

3. Provide and install all equipment.

4. Supply and install all material discussed in this specification.

5. Test and document system, upon completion.

6. Supply and install all material necessary, whether or not discussed in this specification, to result in a complete and functional system.

END OF SECTION
SECTION 28 31 00

FIRE DETECTION AND ALARM SYSTEM

PART 1 GENERAL

The requirements of Section 26 00 00 and 26 05 00 apply to all work hereunder.

1.1 SCOPE

A. Furnish and install an extension to the existing low voltage programmable, networked type fire alarm system as specified herein.

B. The fire alarm system shall conform to the National Electrical Code and NFPA 72 National Fire Protection Association.

C. Installation of the fire alarm system shall not be started until detailed specifications and battery calculations for each component of the system have been approved by the Engineer and the DSA State Fire Marshal.

D. Upon completion of the installation of the fire alarm, a satisfactory test of the entire system shall be made in the presence of the DSA Inspector of Record (IOR).

1.2 RELATED SECTIONS

A. Comply with Division 1, General Requirements and documents referred to therein.

B. Provide all labor, equipment, and materials to complete the Fire Alarm System work in accordance with local and state regulations.

1.3 REFERENCES/APPROVALS

A. The entire installation, including materials and equipment shall meet or exceed the minimum standards and requirements of the following:

   1. Underwriters' Laboratory Inc. listing service.

1.4 SYSTEM DESCRIPTION

A. The existing Fire Alarm System is zoned, non-coded, electronically supervised, microprocessor based hardwired/analog system as manufactured by Siemens Industry, Inc.

It shall be complete with all necessary hardware, software and memory specifically tailored for this installation. It shall be possible to permanently modify the software on site by using an integral service console or plug in programmer. The burning of EPROM to store changes permanently is unacceptable. The main panel shall monitor and control every point and zone in the entire system. Programming of all system points shall be from the main panel.
B. Provide contacts for central station monitoring for alarm and trouble, as well as sprinkler flow and sprinkler tamper contracts. The central station monitoring agreement will be a function of the owner, and will not be included in this contract.

1.5 SUBMITTALS

A. Descriptive data for all products and materials. If any substitutions are rejected the specified product shall be provided.

B. Recommended application and installation methods, including area coverage for smoke detectors and fire alarm load for signaling appliances.

C. Information and data, such as drawings showing device locations and types, riser diagrams, wiring diagrams, approvals, test data, etc. required. Provide worst case voltage drop and battery calculations in the drawing package.

D. Complete shop drawings of all assembled products, including wiring diagrams.

E. Drawings identifying all terminals and illustrating all device wiring connections.

F. All equipment and materials used shall be standard components, regularly manufactured and of the same manufacture.

G. All systems and components shall have been thoroughly tested and proven in actual use.

1.6 PROJECT RECORD DOCUMENTS

A. Per Division 0 and 1.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum of ten years experience, and with service facilities within 100 miles of this project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. The material specified is as manufactured by Siemens Industry or equal. All products shall be from a single manufacturer.

2.2 FIRE ALARM CONTROL PANEL (Existing)

A. The existing Control Panel is Siemens Industry, Inc. MXL Panel.

2.3 INITIATION DEVICES

A. Smoke Detectors: Provide microprocessor based addressable photoelectric smoke detectors with separate base. Detectors shall store history log of alarms and troubles. Detectors shall
have 32 different trouble codes and shall be able to alarm panel even when addressable data is not present. Use: Siemens PE-11 with DB-11 base.

B. Heat Detectors: Provide microprocessor based addressable rate of rise detectors with separate base. Detectors shall store history log of alarms and troubles. Detectors shall have 32 different trouble codes and shall be able to alarm panel even when addressable data is not present. Use: Siemens DT-11.

2.4 ADDRESSABLE MODULES

A. Input Modules: Provide addressable input modules for all for all normally open zones. Modules shall store and report alarms and troubles and shall alarm system even upon loss of addressable data. Use: Siemens TRI-D.

B. Control Relay Module: Provide addressable relay module where required for remote control. Use: Siemens TRI-R.

2.5 SIGNALING APPLIANCES

A. Visual Devices: Use wedge shaped strobes clearly labeled Fire in English. Polarize the strobes for supervised operation. Strobes shall provide a high intensity flashing light as shown on drawings and shall be synchronized for visual signaling.

B. Alarm Horns: Provide fire alarm horns with a minimum sound output of 90 dB at 10 feet. Horns shall provide temporal pattern and shall be synchronized. Horns shall have dual output setting with lower output for classroom. Use only Horns with terminals for wire connections, wire leads are not acceptable.

C. Alarm Horn/Strobe Combinations: Provide flush type fire alarm horn/Strobe with a minimum sound output of 90 dB at 10 feet and a visual output as shown on drawings. Use only Horn/Strobes with terminals for wire connections, wire leads are not acceptable. Strobes shall be synchronized. Horns shall be capable of temporal pattern, shall have dual output setting and shall be synchronized.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall be accomplished in a professional manner by manufacturer certified personnel regularly engaged in and experienced in this type of work.

B. All underground wiring shall meet NEC wet location listing requirements.

C. Use 18 AWG minimum size conductors for fire alarm addressable, hardwire and signal circuit conductors. Use 2 pairs of 16 gauge twisted pair for all network wiring. Install wiring in conduit.

D. All terminations shall be consistent as to the color of conductors throughout the system at like stations. Cables shall not be spliced in such a manner as to change the color code from one termination point to another.
E. No splices (joints) in wiring will be permitted except in terminal cabinets, junction boxes or equipment housing.

F. The entire system shall be checked by the contractor and shall test free of opens, grounds and shorts and shall be made to operate to the satisfaction of the Architect and Owner.

G. Conduct performance tests in presence of DSA Inspector of Record after systems have been placed into operation. Contractor shall furnish competent personnel for these tests. Contractor shall submit written certification stating that system and its component parts are as listed and approved by State Fire Marshal, that installation conforms in all respects to requirements of National Electrical Code, NFPA 72 National Fire Code, that components used (and approved circuits) have not been modified or changed in any way to cause aforementioned approvals or guarantees to be void.

3.2 DEVICE MOUNTING

A. Locate outlets as noted on Drawings.

B. Install pull boxes and terminal cabinets as required in accessible spaces but do not install in finished areas unless approved by Architect.

3.3 TRAINING OF PERSONNEL

A. Administrative staff and maintenance staff shall be thoroughly instructed in the use of the Fire Alarm System by authorized distributor personnel.

3.4 MANUAL AND SUPPORTING DOCUMENTS

A. Furnish two copies of the following manuals:

1. Installation Service Manual.
2. Circuit Description.

END OF SECTION
MEETING MINUTES

PROJECT NAME: Gym Annex Elevator
Contra Costa College
DISTRICT PROJECT NUMBER: C-526
DSA #: 01-113694

C-526 GYM ANNEX ELEVATOR PRE-BID MEETING
Date: May 20, 2014
Time: 3:00 p.m.
Location: Contra Costa College
Building and Grounds Department Conference Room
2600 Mission Bell Drive
San Pablo, CA

INTRODUCTIONS AND SIGN IN

- Introduction of Project Team Members in Attendance:
  - Ron Johnson  Construction Management Services, Critical Solutions, Inc.
  - Owen Letcher  Architect, Lionakis
  - Bruce King  Buildings & Grounds Manager, Contra Costa College

- Self-introduction of meeting attendees.
- Sign-in sheet was circulated. It will be posted to the District’s webpage on 5/21/14.

WELCOME AND INTRODUCTORY REMARKS

- Ron Johnson
  a. An on-site job walk/field presentation follows the meeting. Attendance at a job walk for this project is mandatory. Those attending the job walk must be sure to obtain a Certification of Site Visit (Section 00450), signed by the District Representative. **This signed form must be submitted with your bid.**
  b. Attendance at the Job Walk held on April 16, 2014, and receipt of Certification of Site Visit (Section 00450), signed by the District Representative on that date, satisfies this requirement.
  c. Additional Job Walks have been scheduled for Wednesday, May 21, 2014 at 10:00 a.m., and Thursday, May 22, 2014 at 8:30 a.m.. Attendees should meet at the west entrance to the Gym Annex.

BRIEF PROJECT DESCRIPTION

- Owen Letcher
  a. A modular elevator is to be installed on the west side of the Gym Annex building. Bidders will have to obtain a quote for the elevator from Modular Elevator Manufacturing, a DSA-approved manufacturer, or submit substitution request. Modular elevator will be delivered, assembled, to the site. Cement plaster to be applied to outside of elevator, by Contractor.

- Ron Johnson
  a. Scope also includes abatement, demolition, structural, electrical, fire alarm, and architectural finishes, along with ADA-related work on the existing pathway leading up to the west entrance to the building.

Page 1 of 3
- **PROJECT WORK RESTRICTIONS** (see Section 01140)
  - Ron Johnson
    - a. Building will be occupied by students and faculty during construction.
    - b. Public Safety is vitally important at all times: careful coordination will be needed to maintain the fire/life safety system.
    - c. Temporary partitions to be erected by Contractor, to mitigate noise and dust.
    - d. Bidders are encouraged to carefully review Division 0 & 1, specifically Section 01140, Work Restrictions.

- **BID PHASE COMMUNICATIONS & CORRESPONDENCE:**
  - Ron Johnson
    - a. All project-related questions/RFIs must be submitted in writing (email is preferable) to:
      - **Jovan Esprit, Contracts Manager**
      Contra Costa Community College District
      500 Court St., Martinez, CA 94553
      Email: jesprit@4cd.edu
      Facsimile: 925-370-6517
    - b. Deadline for receipt of RFIs is May 27, 2014, prior to 5:00 p.m.
    - c. Review drawings and specifications early, and submit RFIs as soon as possible.

- **ADDENDA:**
  - Addendum #1, issued April 28, 2014
  - Addendum #2, issued May 14, 2014
  - Addendum #3 will be issued in the next day or two, to further clarify the actual scope of work.

- **BID PHASE SCHEDULE MILESTONES**
  - Last day for RFI: May 27, 2014, prior to 5:00 pm
  - Last Addendum Issued: May 29, 2014
  - Bid Opening: June 5, 2014, prior to 2:00 pm
  - Award of Contract: June 26, 2014
  - Notice to Proceed July 1, 2014 (approximate)

- **BID OPENING:**
  - **Bids will be received prior to 2:00 PM on June 5, 2014.**
  - Bids must be delivered to:
    Contra Costa Community College District Office
    500 Court St, Martinez, CA
  - All bids will be time stamped at the reception counter in the building lobby.
  - Any bid received after the bid opening time will be rejected.

- **BID PACKAGE:**
  - Review your bid package carefully before submitting it. Be sure to include all required documentation.

- **Contract Duration Discussion**
  - Review carefully Section 00600, Construction Agreement.
• 150 Calendar Days to Substantial Completion (SC).
• 45 Calendar Days between SC and Final Completion.
• Take note of Liquidated Damages.

**SUBSTITUTION REQUESTS MUST COMPLY WITH CONTRACT DOCUMENTS**
• See Section 00700, General Conditions, Article 3.11.1, for more information.

**SITE JOB WALK/FIELD PRESENTATION**
• Ron Johnson
  a. General location of new elevator identified on outside of building.
  b. Existing double-door to be changed to a single door.
  c. Saw cutting of concrete will be needed.
  d. Walkway adjacent to entrance will require concrete work/grading to meet ADA requirements.
  e. Staging area can be slightly expanded, more than what is currently indicated on the plans, upon approval by the District.
  f. No exterior abatement is necessary – all abatement, asbestos-containing material ACM and lead-based paint is on the interior walls.
  g. Parking will be allowed along the fence adjacent to the track/field, where labeled “STAFF”, during normal work hours, but not during off-hours, weekends.
  h. Handball Court #3 will be made available to the Contractor for storage.
  i. See Section 001500, for availability of power and water.
  j. Since building will be occupied throughout construction, Contractor is required to construct a floor-to-ceiling partition on first floor. The floor-to-ceiling partition/dust barrier on the second floor shall allow for a 44" access to the top of the stairs.
  k. Any partitions on the stairways shall be constructed in a manner to eliminate dust from occupied areas and not create a safety hazard to people using the stairway.
  l. Blue metal bench, inside building near front door on first floor, and brown metal bench, on exterior of building in the planned construction work area, will be removed by Campus prior to construction.
  m. Power exists in the wall adjacent to the new elevator; existing signs accessibility controls, and emergency lighting fixtures to be salvaged and re-installed.
  n. Handrails on stairs to be removed, and replaced with new wrap-around handrails; Contractor to provide patching and painting.
  o. As this is a functional staircase, existing handrails shall not be removed until new handrails can be installed the same day.

• Owen Letcher
  a. Limited flooring materials will be removed on first and second floors.
  b. Per the as-built drawings, no draft stops are apparent above the ceiling.
  c. Conduit run for electrical and fire alarm shall be concealed above the ceilings of the occupied spaces, and may be exposed in mechanical spaces.

• Bruce King
  a. Temporary power will be available via the Electrical Room (See Section 01500).
  b. Access was provided to the Electrical Room to inspect panels, and determine options for routing of electrical and fire alarm conduit. Some core drilling will be necessary.