

April 7, 2021

ADDENDUM NO. 1

TO THE CONTRACT DOCUMENTS

FOR

PACIFIC HIGH SCHOOL - NEW ADMINISTRATION BUILDING

FOR THE SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT 777 North F Street San Bernardino, CA 92410

DSA No. 04-119637 File No. 36-H7 RCA Job No. 1-78-28

NOTICE TO BIDDERS

This Addendum forms a part of the Contract and modifies the original documents DSA Approved on February 25, 2021. It is intended that all work affected by the following modifications shall conform with related provisions and general conditions of the contract of the original drawings and specifications. Modify the following items wherever appearing in any drawing or sections of the specifications. Acknowledge receipt of Addendum No. 1 in the space provided on the Bid Form. Failure to do so may subject bidder to disqualification.

GENERAL

- Item No. 1.1 General Items:
 - 1.1.1 Reference Front End Bid Documents, campus as-built drawings are available upon request by contacting the District's Plans and Records Department
 - 1.1.2 For bidder reference, the Project Estimate is \$4.5 million.
 - 1.1.3 Reference Front End Bid Documents, a revised **Attachment 1 Bid Form** will be available for bidder reference at Crisp Imaging public plan room website <u>www.crispimg.com</u>

CHANGES TO THE SPECIFICATIONS

Item No. 1	2	Reference New Section 05 51 33 - Metal Ladders:
1	2.1	Add attached new Section 05 51 33 in its entirety.
Item No. 1	3	Reference Section 07 21 00 - Thermal Insulation:
1	3.1	Replace per attached revised Section 07 21 00
Item No. 1	4	Reference Section 07 54 00 - Thermoplastic Membrane Roofing:
1	4.1	Item 2.03.B.1.c, remove "Insulation – Rigid Board" from project. Does not apply.
Item No. 1	5	Reference Section 07 72 00 – Roof Accessories:
1	5.1	Revise per attached revised Section 07 72 00

Item No.	1.6 1.6.1	Reference Section 09 72 00 - Wall Coverings: Item 1.06.C, revise to read "Mock-up may remain as part of Work, only if found acceptable by Architect, subject to rejection."
Item No. 1	1.7 1.7.1	Reference Section 09 91 13 - Exterior Painting: Item 2.01.B.1, remove paint manufacturer Behr.
Item No. 1	1.8 1.8.1	Reference Section 09 91 23 - Interior Painting: Item 2.01.B.1, revise paint manufacturer to PPG Industries in lieu of Behr.
Item No. 2	1.9 1.9.1 1.9.2	Reference Section 10 14 53 - Traffic and Parking Signage: Paragraph 3.02.D, revise to read as follows: D. Set posts in concrete base, size and design of footing as shown on plans. Delete 3.02.D Item 1.
Item No. 2	1.10 1.10.1	Reference Section 27 10 00 – Voice Data Infrastructure: Replace in its entirety per attached Section 27 10 00.
Item No. 1	1.11 1.11.1	Reference Section 28 16 00 – Access Control: Replace section in its entirety per attached Section 28 16 00.

CHANGES TO THE DRAWINGS

Item No. 1.12 1.12	 Reference Sheet C-4.1: Extend domestic water line per clouded area of attached revised Sheet C-4.1
Item No. 1.13 1.13	 Reference Sheet AS-1.0: Revise demo scope per clouded area of attached sketch ASK-1.4.
Item No. 1.14 1.14	Reference Sheet AS-1.1: .1 Revised dimensions per clouded area of attached ASK-1.1 .
Item No. 1.15 1.15	 Reference Sheet A-1.1: Revise per clouded areas of attached revised Sheet A-1.1: a. Detail 1 & 2, revised interior partitions to terminate at mid-height instead of full height.
Item No. 1.16 1.16	 Reference Sheet A-2.1: Revise per clouded areas of attached revised Sheet A-2.1: a. Detail 1, revised interior partitions to terminate at mid-height instead of full height. b. Detail 2, added end wall to parapet bracing for flashing terminations.
Item No. 1.17 1.17	Reference Sheet A-4.1: 7.1 Revise per clouded area of attached Sheet A-4.1.
Item No. 1.18 1.18	 Reference Sheet AD2.2: Detail 29, revise tile transitions per clouded area of attached sketch ASK-1.2.
Item No. 1.19 1.19	 Reference Sheet AD3.2: 2.1 Add new detail 13 per attached sketch ASK-1.3.
Item No. 1.20 1.20	Reference Sheet S0-2.8: 0.1 Add new Detail 15 per attached sketch SSK-1.1 .
Item No. 1.21 1.21	Reference Sheet S1-1.1: 1 Revise foundation plan per clouded area of attached sketch SSK-1.2 .

Item No. 1.22	Reference Sheet S1-3.1:
1.22.1	Revise roof framing per clouded areas of attached sketch SSK-1.3 & SSK-1.4 .
Item No. 1.23 1.23.1	Reference Sheet M-1.2: Supply and Return duct main drops for AC-1 shifted 8" to the right per clouded area of attached Sheet M-1.2
Item No. 1.24 1.24.1	Reference Sheet M-1.3: Supply and Return duct main drops for AC-8 shifted 7" to the right per clouded area of attached Sheet M-1.3
Item No. 1.25	Reference Sheet M-2.1:
1.25.1	AC-1 shifted 8" to the right and AC-8 shifted 7" to the right per clouded area of attached Sheet M-2.1
Item No. 1.26 1.26.1	 Reference Sheet P-1.2: Revise per clouded areas of attached Sheet P-1.2: a. Condensate and gas connection for AC-1 shifted 8" to the right. b. Condensate and gas connection for AC-8 shifted 7" to the right.
Item No. 1.27	Reference Sheet E1.1:
1.27.1	Re-route site utilities per clouded areas of attached revised Sheet E1.1
Item No. 1.28	Reference Sheet E2.1:
1.28.1	Revise fixture locations per clouded area of attached revised Sheet E2.1.
Item No. 1.29	Reference Sheet E3.1:
1.29.1	Add power to Room #121 per clouded area of attached revised Sheet E3.1
Item No. 1.30	Reference Sheet E5.1:
1.30.1	Revise fixture heights per clouded area of attached Sheet E5.1.

ATTACHMENTS

Exhibits	N/A
General	Attachment 1 – Bid Form
Specifications	05 51 33, 07 21 00, 07 72 00, 27 10 00, 28 16 00
Sketches	ASK-1.1, ASK-1.2, ASK-1.3, ASK-1.4, SSK-1.1, SSK-1.2, SSK-1.3, SSK-1.4
Sheets	C-4.1, A-1.1, A-2.1, A-4.1, M-1.2, M-1.3, M-2.1, P-1.2, E1.1, E2.1, E3.1, E5.1

END OF ADDENDUM NO. 1

Roger Clarke, Principal #C-21340

Attachment 1 - Bid Form

SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT

Project:	PACIFIC HIGH SCHOOL – NEW ADMINISTRATION
Project Address:	Pacific High School, 1020 Pacific Street, San Bernardino CA
	Bid No. F21-03
CONTRACTOR NAME:	
DIR REGISTRATION NUMBER:	
ADDRESS:	
TELEPHONE:	_()
FAX:	_()
EMAIL:	

- TO: SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT, acting by and through its Governing Board, herein called "DISTRICT".
- 1. Pursuant to and in compliance with your Notice Inviting Bids and other documents relating thereto, the undersigned bidder, having familiarized himself with the terms of the contract, the local conditions affecting the performance of the contract, the cost of the work at the place where the work is to be done, with the drawings and specifications, and other contract documents, hereby proposes and agrees to perform within the time stipulated, the contract, including all of its component parts, and everything required to be performed, including its acceptance by the DISTRICT, and to provide and furnish any and all labor, materials, tools, expendable equipment, and utility and transportation services necessary to perform the contract and complete all of the work in a workmanlike manner required in connection with the construction of:

Bid No. F21-03 PACIFIC HS - NEW ADMINISTRATION

In the DISTRICT described above, all in strict conformance with the drawings and other contract documents on file at the Purchasing Office of said DISTRICT for amounts set forth herein.

2. <u>Bidder acknowledges the following Addenda:</u>

Addenda Number:	Addenda Number:	Addenda Number:	Addenda Number:	Addenda Number:
A (Inc. in Bid Set)				

3. <u>Total Base Bid</u>

A.	Base Bid	(\$		_)
B.	Allowance #1 General	(\$	200,000.00	_)
C.	Allowance #2 Solar Carport Removal	(\$	420,000.00	

TOTAL PRICE – ENTIRE JOB (Base Bid A + Allowance B + Allowance C)

TOTAL CASH PURCHASE PRICE IN WORDS & NUMBERS:

	DOLLARS
(\$)

4. <u>Alternate Bids:</u> N/A

5. <u>Time for Completion</u>:

The DISTRICT may give a notice to proceed within ninety (90) days of the award of the bid by the DISTRICT. Once the CONTRACTOR has received the notice to proceed, the CONTRACTOR shall complete the work in the time specified in the Agreement. By submitting this bid, CONTRACTOR has thoroughly studied this Project and agrees that the time period for this Project was adequate for the timely and proper completion of the Project. Further, CONTRACTOR has included in the analysis of the time required for this Project, Rain Days, Governmental Delays, and the requisite time to complete Punch List.

In the event that the DISTRICT desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the CONTRACTOR, giving the notice to proceed may be postponed by the DISTRICT. It is further expressly understood by the CONTRACTOR, that the CONTRACTOR shall not be entitled to any claim of additional compensation as a result of the postponement of giving the notice to proceed.

If the CONTRACTOR believes that a postponement will cause a hardship to it, the CONTRACTOR may terminate the contract with written notice to the DISTRICT within ten (10) days after receipt by the CONTRACTOR of the DISTRICT's notice of postponement. Should the CONTRACTOR terminate the contract as a result of a notice of postponement, the DISTRICT shall have the authority to award the contract to the next lowest responsible bidder, if applicable.

It is understood that the DISTRICT reserves the right to reject any or all bids and/or waive any irregularities or informalities in this bid or in the bid process. The CONTRACTOR understands that it may not withdraw this bid for a period of ninety (90) days after the date set for the opening of bids.

6. Bid Security:

Attached is bid security in the amount of not less than ten percent (10%) of the total bid:

Bid bond (10% of the Bid), certified check, or cashier's check (circle one)

7. Designated Subcontractors:

The required List of Designated Subcontractors is attached hereto.

8. Non-Collusion Declaration

The required is attached hereto.

9. <u>Substitution Request Form</u>:

The Substitution Request Form, if applicable, is attached hereto.

10. Acceptance:

It is understood and agreed that if written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned after the opening of the bid, and within the time this bid is required to remain open, or at any time thereafter before this bid is withdrawn, the undersigned will execute and deliver to the DISTRICT a contract in the form attached hereto in accordance with the bid as accepted, and that he will also furnish and deliver to the DISTRICT the Performance Bond and Payment Bond, all within **five (5) calendar days** after award of contract, and that the work under the contract shall be commenced by the undersigned bidder, if awarded the contract, by the start date provided in the DISTRICT's Notice to Proceed, and shall be completed by the CONTRACTOR in the time specified in the contract documents.

11. Notices:

All notices or other correspondence should be addressed to the undersigned at the address stated below:

The names of all persons interested in the foregoing proposal as principals are as follows:

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, state the legal name of such corporation, as well as the names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state the true names of the firm, as well as the names of all individual co-partners comprising the firm; if bidder or other interested person is an individual, state the first and last names in full.)

12. Protest Procedures:

If there is a bid protest, the grounds shall be submitted as set forth in the Instructions to Bidders.

13. CONTRACTOR's License:

a. The undersigned bidder shall be licensed and shall provide the following California CONTRACTOR's license information:

License Number:

Name on License:

Class of License:

DIR Registration Number:

b. If the bidder is a joint venture, each member of the joint venture must include the above information.

14. <u>Time is of the Essence:</u>

Time is of the essence regarding this contract, therefore, in the event the bidder to whom the Contract is awarded fails or refuses to post the required bonds and return executed copies of the Agreement form within **five (5) calendar days** from the date of receiving the Notice of Award, the DISTRICT may declare the bidder's bid deposit or bond forfeited as damages.

15. Declaration:

The bidder declares that he/she has carefully examined the location of the proposed work, that he/she has examined the Contract Documents, including the Plans, General Conditions of the

contract, Supplemental Conditions, Addenda, and Specifications, all other documents issued to bidders and read the accompanying instructions to bidders, and hereby proposes and agrees, if this proposal is accepted, to furnish all materials and do all work required to complete the said work in accordance with the Contract Documents, in the time and manner therein prescribed for the unit cost and lump sum amounts set forth in this Bid Form.

16. Debarment:

In addition to seeking remedies for False Claims under Government Code Section 12650 et seq. and Penal Code Section 72, the DISTRICT may debar a CONTRACTOR pursuant to Article 15 of the General Conditions if the Board or the Board may designate a hearing officer who, in his or her discretion, finds the CONTRACTOR has done any of the following:

- a. Intentionally or with reckless disregard, violated any term of a contract with the DISTRICT;
- b. Committed an act or omission which reflects on the CONTRACTOR's quality, fitness or capacity to perform work for the DISTRICT;
- c. Committed an act or offense which indicates a lack of business integrity or business honesty; or,
- d. Made or submitted a false claim against the DISTRICT or any other public entity (See Government Code Sections 12650, et. seq., and Penal Code Section 72)

17. Designation of Subcontractors:

In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code Sections 4100 et. seq.) and any amendments thereof, each bidder shall list subcontractors on the DISTRICT's form Subcontractor list. This subcontractor list shall be submitted with the bid and is a required form.

18. Bid Certification

I agree to receive service of notices at the e-mail address listed below.

I, the below-indicated bidder, declare under penalty of perjury that the information provided and representations made in this bid are true and correct.

Proper Name of Company	
Name of Bidder Representative	
Street Address	
City, State, and Zip	
Phone Number	Fax Number
E-mail	
Signature of Authorized Bidder Representative	Date

Signatory Name & Title (Printed)

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of authorized officers or agents and the document shall bear the corporate seal; if bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his signature shall be placed above.

All signatures must be made in blue ink

SECTION 05 51 33 METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-fabricated metal ladders.

1.02 REFERENCE STANDARDS

- A. 29 CFR 1910.27 Scaffolds and Rope Descent Systems.
- B. ANSI A14.3 American National Standard for Ladders -- Fixed -- Safety Requirements.
- C. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A36/A36M Standard Specification for Carbon Structural Steel.
- E. ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- F. AWS A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- G. AWS B2.1/B2.1M Specification for Welding Procedure and Performance Qualification.
- H. AWS D1.1/D1.1M Structural Welding Code Steel.
- I. AWS D1.2/D1.2M Structural Welding Code Aluminum.
- J. IAS AC172 Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.
- K. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.03 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- C. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.04 QUALITY ASSURANCE

A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work. B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- C. Bolts, Nuts, and Washers: ASTM A307, plain.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED LADDERS

- A. Provide roof access ladder and cage where required, as indicated on Drawings, fabricated of bar/rail sides and brackets, mounted to building wall, configured and dimensioned in conformance to OSHA Regulation 29 CFR 1910.27.
 - 1. Unless otherwise shown or required by governing authorities, fabricate ladder in accordance with NAAMM standards and recommended details.
- B. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish.
 - 1. Side Rails: 1/2 by 2 inches members spaced at 20 inches.
 - 2. Rungs: 3/4 inch diameter solid round bar spaced 12 inches on center.
 - a. Provide 13 ga. three row non-slip surfaces on top of each rung mechanically pressure punched/stamped.
 - 1) Basis of Design Product: Buttonhole type as manufactured by McNichols Company, or approved equal.
 - 3. Space rungs 8 inches from wall surface.

2.04 FINISHES - STEEL

A. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 07 21 00 THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.

1.03 REFERENCE STANDARDS

- A. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM C553 Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- C. ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

1. Use 2015 as indicated in 2019 CBC Referenced Standards.

- D. ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- **EA.** ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- F. ASTM E119B. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 1. Use 2016 as indicated in 2019 CBC Referenced Standards.
- **GC.** ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 1. Use 2016 as indicated in 2019 CBC Referenced Standards.
- H. D. ASTM E136 Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C.
 - 1. Use 2016 as indicated in 2019 CBC Referenced Standards.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
 - 1. Manufacturer and product identification for each product specified, including R-Value and fire resistance and surface burning characteristics specified herein.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Compliance Certification: Upon completion of installation of building envelope insulation, a card certifying compliance with requirements of California Code of Regulations (CCR) Title 24

for installation of insulation shall be completed, executed and delivered to local building officials, and one copy conspicuously posted at Project site.

E. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Fire Performance Characteristics: Where insulation is used within a fire rated wall assembly, provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, in accordance with methods specified below, by UL or other testing and inspecting agency acceptable to State Fire Marshal.
 - 1. Surface Burning Characteristics: ASTM E84.
 - a. Class A: Maximum flame-spread 0-25 and smoke developed of 0-450.
 - b. Class B: Maximum flame-spread 26-75 and smoke developed of 0-450.
 - c. Class C: Maximum flame-spread 76-200 and smoke developed of 0-450.
 - 2. Fire Resistance Ratings: ASTM E119.
 - 3. Combustibility: ASTM E136.
- B. Comply with Chapter 12-13 Standards for Insulating Materials, California Reference Standards Code (Part 12, Title 24. CCR) as published by Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation.
- C. Comply with California Energy Code:
 - 1. Section 110.8(a): Installed insulating material shall have been certified by the manufacturer to comply with the California Code of Regulations, Title 24, Part 12, Chapters 12-13, Article 3, "Standards for Insulating Material.
 - 2. Section 110.8(c): All Insulating Materials shall be installed in compliance with the flame spread rating and smoke density requirements of CBC Chapters 7 and 26.
 - 3. Section 120.7(b) item 7: The opaque portions of framed demising walls in nonresidential buildings shall be insulated to meet a u-factor of:
 - a. Metal Framed Walls: Not greater than 0.151 (R-6 minimum).
- D. Certificate: As required by the California Building Code (CBC), Title 24, post a certificate containing the building permit number and the insulation manufacturer's name, material identification and R-value and stating that the insulation has been installed in accordance with the plans and specifications.
- E. Performance: Materials shall conform to Section 720, California Building Code.

2.02 APPLICATIONS

- A. Insulation on Inside of Concrete and Masonry Exterior Walls: Glass fiber boardin Wood Framed Walls: Batt insulation with integral vapor retarder.
- B. Insulation in MetalWood Framed Walls: Ceiling Structure: Batt insulation with integral vapor retarder.
- C. Insulation in Wood Framed Walls: Batt insulation with no vapor retarder.
- D. Insulation Over Roof Deck: Polyisocyanurate board.

2.03 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Flame Spread Index (FSI): Class A 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
 - 5. Board Edges: Square.
 - 6. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
 - 7. Products:
 - a. Dow Chemical Company; STYROFOAM CladMate, CavityMate Ultra, or Foamular: www.dowbuildingsolutions.com/#sle.
 - b. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi: www.kingspan.com/#sle.
 - c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.

2.04 FIBERBOARD INSULATION MATERIALS

- A. Mineral Fiberboard Insulation: Rigid mineral fiber, in accordance with ASTM C612.
 - 1. Facing: None, unfaced.
 - 2. Flame Spread Index: 25 or less, when tested with facing, if any, in accordance with ASTM E84.
 - 3. Smoke Developed Index: 50 or less, when tested with facing, if any, in accordance with ASTM E84.
 - 4. Board Size: 48 by 48 inch.
 - 5. Board Thickness: 1-1/2 inches.
 - 6. Board Edges: Square.
 - 7. Thermal Conductivity (k-factor): BTU inch/hr sq ft degrees F of 0.26 per inch at 75 degrees F when tested in accordance with ASTM C518.
 - 8. Maximum Density: 8 pounds per cubic foot, nominal.
 - 9. Products:

- a. CertainTeed Corporation: www.certainteed.com/#sle.
- b. Johns Manville: www.jm.com/#sle.
- c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
- d. Substitutions: See Section 01 60 00 Product Requirements.
- B. Mineral Fiberboard Insulation: Rigid or semi-rigid mineral fiber, ASTM C612 or ASTM C553; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 - 1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
- C. Black faced, Flexible Glass-Fiber Board Insulation: ASTM C612, Type IA; ASTM C553, Types I, II, and III; or ASTM C665, Type I.
 - 1. Where indicated, provide non-woven fiberglass facing on one side; with flame spread index of 25 or less, and smoke developed of 50 or less, when tested in accordance with ASTM E84.
 - 2. Nominal density of not less than 1.5 lb/cu. ft. or more than 1.7 lb/cu. ft., thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 3. Thickness: 2 inches.
 - 4. Manufacturers:
 - a. CertainTeed Corporation; CertaPro AcoustaBoard Black: www.certainteed.com/#sle.
 - b. Johns Manville; Insul-SHIELD Black Faced Board: www.jm.com/#sle.
 - c. Knauf Insulation; Black Acoustical Board with ECOSE Technology: www.knauf.com.
 - d. Owens Corning Corporation; SelectSound Black Acoustic Board: www.ocbuildingspec.com/#sle.
 - e. Substitutions: See Section 01 60 00 Product Requirements.

2.05 BATT INSULATION MATERIALS

- A. Dark Surfaced (Black), Flexible Glass-Fiber Blanket Insulation: ASTM C612, Type IA; ASTM C553, Types I, II, and III; or ASTM C665, Type I.
 - 1. One side faced with black glass-fiber mat or black polymer finish.
 - Where indicated, provide black, non-woven fiberglass facing on one side; with flame spread index of 25 or less, and smoke developed of 50 or less, when tested in accordance with ASTM E84.
 - 3. Thickness: 2 inches.
 - 4. NRC: 0.80.
 - 5. Manufacturers:
 - a. CertainTeed Corporation; CertaPro AcoustaBlanket Black: www.certainteed.com/#sle.
 - b. Johns Manville; Insul-SHIELD, Black-Faced (Black Core) Rolls: www.jm.com/#sle.
 - c. Knauf Insulation; Black Wall and Ceiling Liner M: www.knauf.com.
 - d. Owens Corning Corporation; SelectSound Black Acoustic Blanket: www.ocbuildingspec.com/#sle.
 - e. Substitutions: See Section 01 60 00 Product Requirements.

- **BA**. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 4. Formaldehyde Content: Zero.
 - 5. Exterior Walls:
 - a. Thermal Resistance: Minimum R-value of 1925.
 - b. Thickness: **5Two layers up to 7**-1/24 inch.
 - 6. Underside of Roof:
 - a. Thermal Resistance: R-value of 30.
 - b. Thickness: 10-1/4 inch.
 - 7. Facing: Aluminum foil, flame spread 25 rated; one side.
 - 88. Exposed Facing in Rooms and Enclosed Spaces: FSK (Foil-Scrim-Kraft), one side. a. Class C per ASTM E84.
 - 9. Exposed Facing in Corridors and Enclosures for Exit Access Stairways and Exit Access Ramps: FSK (Foil-Scrim-Kraft), one side.

a. Class B per ASTM E84.

- 10. Products:
 - a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. Johns Manville: www.jm.com/#sle.
 - c. Knauf Insulation: www.knauf.com.
 - d. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - e. Substitutions: See Section 01 60 00 Product Requirements.
- CB. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 - 1. Typical at interior walls.
 - 2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 - 3. Products:
 - a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
 - b. Knauf Insulation; EcoBatt Insulation: www.knaufinsulation.com/#sle.
 - c. ROCKWOOL (ROXUL, Inc); COMFORTBATT: www.rockwool.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.

2.0604 ACCESSORIES

A. Insulation Fasteners: Lengths of unfinished, 13 gauge, 0.072 inch high carbon spring steel with chisel or mitered tips, held in place by tension, length to suit insulation thickness and substrate, capable of securely supporting insulation in place.

- B. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
 - 1. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
 - 2. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 - 3. Finish: Painted matte black at exposed interior acoustical board application.
 - 4. Products:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
 - c. Gemco; Spindle Type.
- C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- D. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- E. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Adhere 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation Over Roof Deck, General:
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 3. Do not apply more insulation than can be covered with roofing on the same day.

3.043.02 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.0503 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.0604 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 72 00 ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches, manual and automatic operation, including smoke vents.
- B. Non-penetrating pedestals.

1.02 RELATED REQUIREMENTS

- A. Section 05 31 00 Steel Decking.
- B. Section 05-50 00 Metal Fabrications.
- €B. Division 7 Thermal and Moisture Protection: Roofing System
- ĐC. Section 07 62 00 Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1910.23 Ladders.
- B. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- E. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- F. MSS SP-58 Pipe Hangers and Supports Materials, Design, Manufacture, Selection, Application, and Installation.
- G. OSHA 29 CFR 1910.23 Fall Protection in General Industry; current edition.

1.04 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- B. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
 - 1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.
 - 2. Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in California.

- C. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in District's name and registered with manufacturer.
 - 3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 QUALITY ASSURANCE

A. Pre-Installation Conference: Participate in conference with insulation and built-up roofing manufacturer and applicator as required in roofing section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.07 WARRANTY

- A. See Section 01 78 00 Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for hatches.

1.08 WARRANTY

A. Extended Warranty, Roof Hatches: Manufacturer's standard five year warranty.

PART 2 PRODUCTS

2.01 ROOF HATCHES, MANUAL AND AUTOMATIC OPERATION

- A. Roof Hatch Manufacturers:
 - 1. Activar Construction Products Group JL Industries: www.activarcpg.com/#sle.
 - 2. Acudor Products Inc: www.acudor.com/#sle.
 - 3. Babcock-Davis: www.babcockdavis.com/#sle.
 - 4. BILCO Company; Type E Ladder Access: www.bilco.com/#sle.
 - 5. Dur-Red Products: www.dur-red.com.
 - 6. Milcor, Inc: www.milcorinc.com.
 - 7. Nystrom, Inc: www.nystrom.com/#sle.
 - 8. Substitutions: See Section 01 60 00 Product Requirements.
- B. Roof Hatches: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.
 - 3. Size: As indicated on drawings; single-leaf style unless indicated as double-leaf.

- a. For Ladder Access: Single leaf; 36 by 36 inches.
- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
 - 1. Material: Mill finished aluminum, 11 gauge, 0.0907 inch thick.
 - 2. Insulation: Manufacturer's standard; <u>13</u> inch rigid glass fiber, located on outside face of curb.
 - 3. Curb Height: 12 inches from surface of roof deck, minimum.
 - 4. Flange: 3-1/2 inches with pre-drilled holes for attachment to roof deck..
- D. Metal Covers: Flush, insulated, hollow metal construction.
 - 1. Capable of supporting 40 psf live load, internal loading of 20 psf (0.96 kPa).
 - 2. Material: Mill finished aluminum; outer cover 11 gauge, 0.0907 inch thick, liner 0.04 inch thick.
 - 3. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
 - 4. Gasket: Neoprene, continuous around cover perimeter.
- E. Safety Railing System: Roof hatch manufacturer's standard accessory safety rail system mounted directly to curb.
 - 1. Railing: Comply with 29 CFR 1910.23 for ladder safety, with a safety factor of two.
 - 2. Posts and Rails: Aluminum tube.
 - 3. Gate: Same material as railing; automatic closing with latch.
 - 4. Finish: Manufacturer's standard, factory applied finish.
 - 5. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
 - 6. Mounting Brackets: Hot dipped galvanized steel, 1/4 inch thick, minimum.
 - 7. Fasteners: Stainless steel, Type 316.
 - 8. Manufacturers:
 - a. BILCO Company; Bil-Guard 2.0: www.bilco.com/#sle.
 - b. Substitutions: See Section 01 60 00 Product Requirements.
- F. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
 - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
 - 2. Hinges: Heavy duty pintle type.
 - 3. Automatic hold open arm with vinyl-coated handle for manual release.
 - a. Automatic hold-open arm complete with red or contrasting colored vinyl grip handle to permit easy release and one-hand control of cover to closed and latched position.
 - 4. Latch: Upon closing, engage latch automatically and reset manual release.
 - 5. Manual Release: Pull handle on interior and exterior.
 - 6. Locking: Padlock hasp on interior and exterior.

2.02 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

- A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factoryfabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
 - 1. Design Loadings and Configurations: As required by applicable codes.
 - 2. Height: Provide minimum clearance of 6 inches under supported items to top of roofing.
 - 3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - 5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.
 - 6. Manufacturers:
 - a. Metal Roof Innovations, Ltd. S-5! Attachment Solutions; S-5! Utility System: www.s-5.com/#sle.
 - b. PHP Systems/Design: www.phpsd.com.
 - c. Portals Plus: www.portalsplus.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.
- B. Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.
 - 1. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
 - 2. See relevant piping system specification section for additional requirements.
- C. Non-Penetrating Pedestals: Steel pedestals with square, round, or rectangular bases.
 - 1. Bases: High density polypropylene.
 - 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - 4. Manufacturers:
 - a. Metal Roof Innovations, Ltd. S-5! Attachment Solutions; S-5! Utility System: www.s-5.com/#sle.
 - b. Portals Plus; Pedestal Plus: www.portalsplus.com/#sle.
 - c. Substitutions: See Section 01 60 00 Product Requirements.

2.03 ACCESSORIES

- A. Ladder Safety Post:
 - 1. Furnish and install where indicated on plans ladder safety post Model LU-1 manufactured by Bilco Company; www.bilco.com, or equal. The ladder safety post shall be preassembled from the manufacturer.
 - a. Substitutions: See Section 01 60 00 Product Requirements.
 - 2. Performance characteristics:

- a. Tubular post shall lock automatically when fully extended.
- b. Safety post shall have controlled upward and downward movement.
 - 1) Release lever shall disengage the post to allow it to be returned to its lowered position.
- c. Adjustable Mounting Bracket Spacing: Up to 14 inches on center.
 - 1) Clamp Bracket Size: 1-1/4 inch in diameter.
- 3. Post: High strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- 4. Activation: Pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- 5. Material of construction: Steel (Model LU-1, LU-2).
- 6. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
- 7. Hardware: All mounting hardware shall be Type 316 stainless steel.
- 8. Factory Finish: Yellow powder coat steel (Model LU-1).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Operational Units: Test and operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 27 10 00

VOICE / DATA/ IP INFRASTRUCTURE

PART 1 – GENERAL

- 1.1 Include all labor, equipment, and materials necessary for providing a complete networking infrastructure system as described herein and/or as indicated on the drawings.
- 1.2 Related specification sections:
 - 1.2.1 Section 26 01 00 General Provisions
 - 1.2.2 Section 26 05 19 Conductors
 - 1.2.3 Section 26 05 33 Conduit and Fittings
 - 1.2.4 Section 26 05 34 Outlet and Junction Boxes
- 1.3 Contractors working on SBCUSD work projects shall possess as a minimum the following qualifications. Proof of qualification for each item shall be submitted with the project response. Failure to submit proper proof of compliance with each qualification may result in project disqualification. Provide documentation with the project response confirming the following qualifications:
 - 1.3.1 A manufacturer's Certified Installer/Contractor agreement in force at the time of submittal and throughout the entire construction process. A current support document shall be included in the Contractor's response.
 - 1.3.2 Certified to provide factory warranties including a product component warranty and a system performance warranty. The factory warranty period shall not be less than 20 years. Provide current Manufacturer Certificate with response.
 - 1.3.3 Have a Registered Communications Distribution Designer (RCDD[®]) directly employed by the vendor who will be ultimately responsible for this project. Submit current RCDD Certificate with response.
 - 1.3.4 The contractor shall ensure that 100% of the technicians installing a copper system have received a manufacturer's training certificate for copper systems. Submit current certifications for each technician with response.
 - 1.3.5 The contractor shall ensure that 100% of the technicians installing a fiber optic system have received a manufacturer's training certificate for fiber optic systems. Submit current certifications for each technician with response.
 - 1.3.6 The contactor shall have copies of the technicians' certificates available for inspection by the SBCUSD IT Representative upon request.

- 1.3.7 Vendor shall hold in good standing a California C-10 license and a valid California C-7 license. A copy of the license(s) is/are to be included in the vendor's response.
- 1.3.8 Employ Technicians with current Voice Data Video certification by State of California Department of Industrial Relations. Submit proof with response.
- 1.3.9 Employ technicians with minimum of 10 hours of Construction Safety and Health training as provided by Cal/OSHA. Submit with response.
- 1.3.10 The Vendor must have completed a minimum of five projects of similar size and scope for public School District entities within the past three years, and have a successful history of sales, installation, service, and support. Provide references of similar projects with response.
- 1.3.11 All Low Voltage and High Voltage work shall be done "in-house", no subcontractors for this type of work.
 - 1.3.11.1 Any subcontractors for any work outside of Low Voltage/High Voltage work must be included in the response or that subcontractor will not be allowed to be utilized later (i.e., trenching subcontractor). Vendor must act as prime.
- 1.4 Supporting Codes and Standards Documents

It is not possible to list all of the applicable Codes and Standards documents. A noninclusive list of key documents is presented below as a minimum:

- 1.4.1 ANSI/EIA/TIA-568-B: Commercial Building Telecommunications Cabling Standard
- 1.4.2 ANSI/EIA/TIA-569-A: Commercial Building Standard for Telecom Pathways and Spaces
- 1.4.3 ANSI/EIA/TIA-606: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- 1.4.4 ANSI/EIA/TIA-607: Commercial Building Grounding/Bonding Requirements
- 1.4.5 NFPA 70: National Electrical Code
- 1.4.6 ISO/IEC 11801: Generic Cabling for Customer Premises
- 1.4.7 BICSI :Telecommunications Distribution Methods Manual (TDDM)
- 1.5 The latest revision of each document, and other related documents, is to be considered the one in force at the time of system construction and delivery to SBCUSD. The vendor is required to comply with the applicable documents in content and intent as well.

1.6 If any applicable documents are in conflict, then the more stringent requirement shall apply. The Contractor is required to advise the SBCUSD Information Technology (IT) Representative of any conflict that could result in work deficiencies.

1.7 Cabling System

All copper and fiber optic components of the cabling system are either to be of a single manufacturer, or of a manufacturer partnership under a system trade name offering a single point of contact for SBCUSD in the event of a warranty claim. The SBCUSD has chosen the Panduit TX6A 10 Gig UTP Copper Cabling solution as the baseline for all equivalents to be measured.

1.7.1 **Panduit/General Cable**

- 1.7.1.1 Installing Contractor must be NetKey Certified Installer certified to install this system.
- 1.7.1.2 Warranty provision and training must be for the Panduit Certification Plus System Warranty – 25-Year Performance program.
- 1.7.2 Warranty shall be to the District, for the period as defined by the Network Infrastructure System selected for installation, after District acceptance and sign-off of the completed system. The Contractor must provide documentation from one of the approved manufacturers, as indicated in Section 1.4, indicating their qualifications for installation of this system in compliance with the manufacturer/s warranty period requirements as warranted Contractor.
- 1.7.3 Equipment qualifications: It is the intent of these specifications that each bidder provides all hardware, components and installation services that are necessary to ensure a fully operational wiring system including warranties, as shown in the EIA/TIA Category-6 and the Augmented Category-6 (6A) guidelines.
- 1.7.4 Copper System: SBCUSD requires a high performing Category 6A system that meets the following system performance guaranteed headroom as a minimum based on worst pairs:

Electrical Value	TIA/EIA	ISO
	Category 6A	Class EA
Insertion Loss	3%	3%
NEXT	3.5 dB	2.5 dB
PSNEXT	5 dB	4 dB
PSACR-F	10 dB	10 DB
Return Loss	3 dB	3 dB
PSACR-N	6.5 dB	6.5 dB
PSANEXT	2 dB	2 dB
PSAACR-F	10 dB	10 dB

- 1.7.5 All components, parts, infrastructure, patch cables, termination panels and cables must be classified by the manufacturer or manufacturers as a part of the "Extended Warranty" program. Contractor may not mix in components from other certified programs or materials that are not considered part of the "Lifetime" warranty.
- 1.7.6 Systems or components as manufactured by any other manufacturer which, are not specifically listed in **1.4 1.7.1** are **not** approved for use on this project.
- 1.8 Installing Contractor qualifications: Firms and their personnel must be regularly engaged in the installation of data networking cabling and equipment for systems of similar type and scope. The Contractor must have a full-service office able to respond to emergency callouts during the warranty period. The Contractor must also provide complete installation of all wiring and devices or equipment. Subcontractors with Electrical Contractors or other warranted or non-warranted Contractors for supervised installation of any part of this system are not approved.
 - 1.8.1 Contractor shall have on staff a minimum of (1) BICSI RCDD as full-time employees.
 - 1.8.2 The successful Contractor shall be a California licensed C7 or C10 Premise Wiring Contractor as defined in this specification.
 - 1.8.3 All work shall be performed under the supervision of a company accredited and trained by the Manufacturer of the components and cable and such accreditation must be presented with the bid submittal. All personnel performing work on this project must have successfully completed the manufacturer's training courses to completely comply with the extended warranty requirements prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer or manufacturers.
 - 1.8.4 All personnel engaged in the testing of premises fiber optic and copper UTP cable systems must have successfully completed the test equipment manufacturer's training courses. Certification of such training must be presented with the bid submittal. Cut sheets of the test equipment to be utilized shall be provided with Phase I project material submittals.
 - 1.8.5 This project shall employ Augmented Catefory-6 cabling ONLY. The Contractor shall install the related components in relation to the performance requirements for the type of cable installed.
 - 1.8.6 If Contractor routes cable and/or associated pathways in another route than indicated on the drawings, they shall maintain all maximum cable installation distances as required by the manufacturer's distance limitations.

- 1.9 In order to ensure project cohesion, a single point of contact is required to provide a "TURNKEY" solution. The work covered under this section of the specification consists of furnishing all: labor, cabling, equipment, supplies, materials, and training.
- 1.10 The drawings indicate a schematic routing of cables above-ceiling cable prior to bid. Where cables penetrate through walls a conduit sleeve shall be provided. Where cables pass through fire rated walls, the conduit sleeve shall be sealed to maintain the rating of wall assembly.
- 1.11 Unless otherwise noted in the project drawings or these specifications, the Division 26 Contractor shall provide the installation of all conduits, outlet and junction boxes, trenching and pull box installation.
- 1.12 General Submittal Requirements
 - 1.12.1 **Phase I Submittal** shall be made in electronic format within (20) working days after the award of the contract by the District. This submittal shall include the following:
 - 1.12.1.1 Complete Bill of Materials in Excel Spreadsheet format with bills of quantities, including all materials, components, devices, and equipment required for the work. The bills of quantities shall be tabulated respective of each and every system as specified, and shall contain the following information for each Section listed:
 - 1.12.1.2 Description and quantity of each product.
 - 1.12.1.3 Manufacturer's Name and Model Number.
 - 1.12.1.4 Manufacturer's Specification Sheet or Cut Sheet.
 - 1.12.1.5 Specification Item Number reference for each required product or if not shown in the specification, Drawing Detail Number being referenced (i.e. Spec 2710000 Item 2.1 or DWG E4.15/#1).
 - 1.12.1.6 Include with submittals all warranty information and a description of support and maintenance services to be provided. Also include all licenses and maintenance agreements required for continued operation of the equipment.
 - 1.12.2 **Phase II Submittal** shall be provided with (20) working days after the approval of the Phase I submittals and prior to any fabrication of field conduit installations. All shop drawings shall be engineered in a CAD Software. Submission shall include electronic print copies to match the contract drawings, and Phase II submittals drawings shall include the following:

- 1.12.2.1 MDF and IDF equipment rack or cabinet elevations will be required to be provided including cable routing, grounding, support, UPS, network electronics, etc. and position of all components in the rack or cabinet.
- 1.12.2.2 Provide labeling plan which identifies the proposed scheme for identifying all components including racks, patch panels (fiber and copper), site distribution feed cables, horizontal station cables and site conduit systems (handholes, pullboxes, etc.).
- 1.12.2.3 Provide shop drawings showing all end device locations, tap values, paging zones and amplifier sizing for each zone for analog speakers and horns, including devices connected to IP-Based zone controllers.
- 1.12.3 Common submittal mistakes which will result in submittals being rejected:
- 1.12.3.1 Not including the qualifications of the installing Contractor Company and Contractor's Staff.
- 1.12.3.2 Not including all items listed in the above itemized description.
- 1.12.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlights, underlining or clouding the items to be reviewed (provided for the project) or crossing out the items which are not applicable.
- 1.12.3.4 Not including actual manufacturer's cut sheets or catalog information of proposed products.
- 1.12.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.
- 1.12.4 The Contractor shall make a written request directly to Johnson Consulting Engineers for electronic drawing files (CAD). As a part of the written request, please include the following information:
 - 1.12.4.1 Clearly indicate Project Name and Client, Johnson Consulting Job Number (located in the bottom left corner of JCE Engineering Stamp) and each drawing Sheet Number required (i.e. E1.1, E2.1, E4.1 etc.)
 - 1.12.4.2 Identify the Name, Company, Title, phone number, mailing address and e-mail address of the person to receive the files.

- 1.12.4.3 Detail or Riser diagram sheet, System Schematic drawings or any other drawings other than floor plans or site plans, will not be made available to the Contractor.
- 1.12.4.4 Files will only be provided in the AutoCAD format in which they were created (i.e. version 2015 or version 2016). Files will not be made available in REVIT format.
- 1.12.4.5 Requests for files will be processed as soon as possible; a minimum of (7) working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use and delays in requesting files will not alleviate the Contractor from submitting required documents within the required timeline.
- 1.13 Copper Cable Color Standards for Horizontal Cabling, Jack Inserts and Patch Cords:

The following colors are the District Standards for the specific network devices and services listed below:

- 1.13.1 <u>Yellow:</u> The Default color to be utilized when the project to install cabling has no specific device/service usage already determined, or will be used for general Data services (i.e. Internet Access by wired classroom drops) or is not specified to be one of the other color definitions. The District has standardized on the color Yellow for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Yellow in color if the devices/services are still not identified at the time of installation. Otherwise, at any point prior to the installation of the cabling, inserts or patch cables, if the device types and services become known, the color is to be switched to the identified color standard in support of those now identified devices and services listed below.
- 1.13.2 <u>Red</u>: To be utilized when the project to install cabling has determined that the devices and services are in support of Alarms, Energy Management Systems (EMS), and Environmental monitoring. The District has standardized on the color Red for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Red in color.
- 1.13.3 <u>Orange</u>: To be utilized when the project to install cabling has determined that the devices and services are in support of Wireless Access Points (internal and external). The District has standardized on the color Orange for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Orange in color.
- 1.13.4 <u>Green:</u> To be utilized when the project to install cabling has determined that the devices and services are in support of IP Cameras for Video Surveillance. The District has standardized on the color Green for horizontal cabling and jack

inserts and patch cables on both ends of the horizontal cabling must also be Green in color.

- 1.13.5 <u>Blue:</u> to be utilized when the project to install cabling has determined that the devices and services are in support of Audio/Visual displays and devices that connect clients to those projectors/TVs. This includes all Wi-Di devices, Projectors and Apple TVs. The District has standardized on the color Blue for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Blue in color
- 1.13.6 <u>Purple:</u> To be utilized when the project to install cabling has determined that the devices and services are in support of VOIP/Voice Phones/VOIP Hardware. The District has standardized on the color Purple for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Purple in color.
- 1.13.7 <u>Black:</u> To be utilized when the project to install cabling has determined that the devices and services are in support of IP-based Bells and Paging. The District has standardized on the color Black for horizontal cabling and jack inserts and patch cables on both ends of the horizontal cabling must also be Black in color.

1.14 Cable

SBCUSD requires all cabling being installed within a building to be plenum rated in all environments. Even though quite desirable, SBCUSD is not aware of a Category 6A indoor/outdoor plenum-rated cable. As a result, SBCUSD is willing to accept an indoor/outdoor CM rated cable as long as the NEC termination and pathway requirements are met. Regardless of environment, the cabling shall be of the same electrical performance as Category 6A and be warranted by the same cabling system manufacturer, as Panduit or equivalent.

- 1.14.1 Ethernet patch cords must be made of 100% pure bare copper wire, as opposed to copper clad aluminum (CCA) wire, to be fully compliant with UL Code 444 and National Electrical Code TIA-568-C.2 fire and safety standards, which require pure bare copper wire in communications cable.
- 1.14.2 Installation of cabling shall be of continuous length from each termination point.
- 1.14.3 No length of cable shall exceed 285 feet (tested length)
- 1.14.4 The bend radius of any cable shall not exceed 4 times the diameter of the cable.
- 1.14.5 Should the cable become kinked while being installed, the contractor shall not attempt to repair the cable, but shall remove and replace the entire run. All cable runs are potential inspection items for the SBCUSD IT Representative.
- 1.14.6 The cable jacket shall be maintained as close to the point of termination as possible.

- 1.14.7 The cable pairs shall not be untwisted more than 1/2" from the termination point.
- 1.14.8 All cabling is to be installed in its own pathway and fully supported.
- 1.14.9 Cabling shall be installed with no more than a 4-foot space between supports.
- 1.14.10 Cabling can be installed in pathways such as cable tray and ladder racking, as long as the pathway is low-voltage cabling only, the pathway is appropriately bonded to the building grounding system, and the Data System cables are bundled separately from other low voltage cabling
- 1.14.11 Underground cabling can be installed inside buildings to the ultimate termination point without transition as long as the cabling is rated for such applications.
- 1.14.12 Industry Standard cable waste varies between 7% and 10% per project and the District will not accept final invoices for cabling where cable waste exceeds 10%
- 1.15 Terminations
 - 1.15.1 Jack modules shall be of insulation-displacement termination construction and may offer mass termination of all four pairs simultaneously. In addition, a jack module must be available as part of the cabling system, and facilitate the same system performance and warranties, that can be utilized in existing workstation outlet faceplates from other manufacturers. The most common situation is the Avaya (Lucent) system. Another common situation is Wiremold 5400 raceway.
 - 1.15.2 In an effort maximize space, SBCUSD has standardized on a discrete modular patch panel system. The system must allow the following:
 - 1.15.2.1 Presentation of 48 individual module ports in a 1U (1.75") rack height, preferred.
 - 1.15.2.2 Presentation of 24 individual module ports in a 1U (1.75") rack height.
 - 1.15.2.3 Presentation of 12 individual module ports to be mounted in an 89B type wall bracket.
 - 1.15.2.4 Category 6A connectivity
 - 1.15.3 Cabling shall be dressed cleanly and fully supported via hook & loop straps and cabinet/rack supports. All cabling bundles are to be loosely secured with hook & loop straps only. Cable ties are not to be utilized. In addition, hook & loop straps must not be spaced at regular intervals but must vary between 4-6 inches at random over the length of the secured cable section.

- 1.15.4 Cabling slack can be placed in the cabinet/rack area as well as the ceiling areas if fully supported by the proper pathway device. No more than 4 feet per horizontal run shall be stored.
- 1.15.5 It is preferred that horizontal cabling does not bypass a patch panel and be terminated and directly plugged into a switch. Any cases would need to be signed off by SBCUSD IT Representative(s).
- 1.15.6 No particular order is required between workstation cabling terminations or Access Point cabling terminations, though there are instances where AP cabling must be on a specific patch panel associated with an AP supporting edge switch and other existing AP cabling.
- 1.15.7 The patch panel ports are to be populated beginning with port one in sequence (left to right), leaving no open ports. The only exception will be with 24-port switches that have their ports only on the right side of the faceplate and will require patch panel ports to be populated from right to left to allow for the desired patch cord lengths to work.
- 1.15.8 Provide a minimum of 20% spare ort capacity for future use.
- 1.15.9 Any new copper cabling to patch panels should be patched into an open switchport if available. If no ports are available, do not unplug any existing connectivity. Notify SBCUSD IT Representative(s) that a new switch is needed.
- 1.15.10 Fiber optic cabling shall be terminated in a fiber enclosure of appropriate size for the cabling being terminated. Unused adaptor panel ports shall be filled with blank panels
- 1.15.11 Provide a spreadsheet indicating what drops are cabled to the active switch port to be turned over to the SBCUSD IT Representative.

PART 2 – PRODUCTS

- 2.1 Equipment racks have been detailed on the drawings and additional component information requirements have been described in the following sections and on the drawings. The following is a list of approved manufacturers for each type of rack to be furnished.
 - 2.1.1 Alternate equipment manufacturers other than those indicated will not be reviewed or approved for use on this project.
 - 2.1.2 (Open Frame 4-Post) shall be manufactured by Southwest Data Products , Chatsworth CPI Quadrarack #50120-703 or Middle Atlantic R4 Series. Reference drawing details and specifications for complete requirements.

- 2.2 Open Frame 4-Post Racks, 19" mounting Width by 84" High by 29" Deep with #12-24 mounting holes as shown in the MDF of IDF Room layouts. Contractor shall be responsible for providing all racks and accessories. Furnish and install with the following:
 - 2.2.1 The racks shall be provided with structural seismic bracing using cable runway to the top of the rack.
 - 2.2.2 Universal 12" cable runway shall be as manufactured by Southwest Data Products or CPI. The cable runway shall be furnished with the additional adapters, connectors, support components, bends and offsets and extensions as required to fit the room and layout.
 - 2.2.3 Anchor the cable runway to the wall with the appropriate width angle bracket and bolts as manufactured by Southwest Data Products or CPI.
 - 2.2.4 The cable runway shall also be attached to the top of the rack with the appropriate adapter panel. Cable runway shall be directly attached to the 4-Post racks with J-Hooks.
 - 2.2.5 Cable runway routed along walls, shall be offset from the wall a minimum of 6" and shall be supported with cantilevered wall mount brackets.
 - 2.2.6 Floor mounted racks shall be structurally anchored to the floor with the anchors and bolts.
 - 2.2.7 Provide full length vertical wire managers, CPI Double-Sided Narrow Vertical Manager, Part #12096-703, on each side of each rack. Vertical managers between racks may be substituted with the CPI #11729-703 6" wide double-sided manager. Single narrow vertical managers shall be provided on each end of the group of racks.
 - 2.2.8 Provide Middle Atlantic Model #VDC-6-45-DC vertical managers when installing the Middle Atlantic R4 Series racks.
 - 2.2.9 Provide (1) adjustable full depth vented shelf for each 4-Post equipment rack as manufactured by Southwest Data Products or CPI #12700-719.
 - 2.2.10 Provide horizontal wire managers between each patch panel or (1) manager per patch panel. Provide (1) spare manager per rack. Provide 2RMU height managers for each 48-Port patch panel and 1RMU height managers for 24-Port patch panels. CPI part #30130-719 and #30139-719.
 - 2.2.11 Provide (1) minimum or more where detailed on drawings. Rack mounted surge arrest style power distribution unit per rack. 1 rack unit in height. TrippLite Model #PDUMH15NET2 with (8) NEMA 5-15R outlets, built-n SNMP Ethernet interface and NEMA L5-15P input with 5-20P adapter or approved equal by APC. Provide with minimum 10-foot cord for the PDU.

- 2.2.12 Contractor shall be responsible for neatly routing, storing and connecting the power cords from the PDUs to the electrical outlet or UPS as directed by the District. Power cords shall be dressed separately from the UTP cables or any other low voltage cable and shall be secured to the back of the rack or cable runway with Velcro ties.
- 2.2.13 Furnish grounding to each rack. Each rack shall be provided with a grounding terminal block, #6 Ground wire from the rack to the bus bar and a compression lug on the end of the ground wire at the bus bar. Provide grounding components as manufactured by CPI #40167-001 terminal block and #40162-901 compression lug or approved equal.
- 2.2.14 Provide (1) ground bus bar kit per MDF Room. Ground Bus Bar Kit as manufactured by CPI #40158-012 or approved equal. Ground Bus Bar and all bonding conductors to the bus bar shall be labeled. Grounding conductors shall be routed to the equipment racks, cable runway and electrical panel.
- 2.2.15 All fiber optic feed cables routed to the MDF Room shall be provided with 20-feet of slack for a service loop mounted on the backboard behind the racks. Contractor shall provide a 24" diameter wall mounted service loop manager for the fiber optic feed cables as manufactured by Leviton #48900-FR. Maximum of (3) fiber feed cables per manager. Provide quantity of managers as required to manage all service loops.

MDF Room Requirements

- 2.3 The main Distribution Frame (MDF) Room shall be the central wiring and equipment location for the network infrastructure systems. This room is existing for this project.
- 2.4 Provide Fiber Optic Feed Cable Patch Panels Fiber optic termination equipment (rack mounted), including all associated installation hardware. The equipment must have a sufficient number of ports to connect all fibers in every cable terminated at this location. Provide 25% spare capacity for future wiring requirements, including bulkheads in the fiber patch panel. Provide blank fillers for all used portions of the panel. All fiber feed cables shall be terminated in a single fiber optic patch panel up to 144 strands. Additional strands shall be terminated in the largest size required to continue the remaining fibers.
 - 2.4.1 Contractor shall provide a minimum of 6-feet of slack on the fiber feed cable in the fiber optic patch panel. The first 48" of a tight buffered cable or the first 24" of a loose tube cable shall not be stripped back in the patch panel. Each type of cable shall have a minimum of 24" of stripped slack within the patch panel. Total slack within the patch panel shall not be less than 6-feet in length.
 - 2.4.2 All fiber cables shall be secured to the patch panel with the Kevlar strength members at the manufacturer provided anchor point at the rear of the panel.
IDF Location Requirements

- 2.5 The Intermediate Distribution Frame (IDF) Room shall be a secondary wiring and equipment location for the data networking system. The Contractor shall include the following items at this location:
 - 2.5.1 Provide backboard 8'-0" high x ³/₄" thick, with a minimum 48" width with minimum 2 coats of fireproof paint(not over labels).Refer to the floorplans for the actual layout of the backboard coverage. Plywood mounting backboard shall be flame resistant, painted with fire resistant paint "white" or color to match the room finish. Contractor shall provide minimum one side finish grade plywood. Backboard shall be mounted with finish side out, regardless of location of fire rating stamp. Show proof of fire rating stamp to IOR on Inspector prior to installation.
- 2.6 Provide Fiber Optic Feed Cable Patch Panels Fiber optic termination equipment (rack mounted), including all associated installation hardware. The equipment must have a sufficient number of ports to connect all fibers in every cable terminated at this location. Provide 25% spare capacity for future wiring requirements. Provide blank fillers for all used portions of the panel. All fiber feed cables shall be terminated in a single fiber optic patch panel.
 - 2.6.1 Each IDF location shall be furnished with a minimum 24-Port patch panel, fully loaded with bulkheads. Type of connectors in the bulkheads shall be determined by the type of connectors used for termination of the fiber feed cables.
 - 2.6.2 Contractor shall provide a minimum of 6-feet of slack on the fiber feed cable in the fiber optic patch panel. The first 48" of a tight buffered cable or the first 24" of a loose tube cable shall not be stripped back in the patch panel. Each type of cable shall have a minimum of 24" of stripped slack within the patch panel. Total slack within the patch panel shall not be less than 6-feet in length.
 - 2.6.3 All fiber cables shall be secured to the patch panel with Kevlar strength members at the manufacturer provided anchor point at the rear of the panel.
- 2.7 Augmented Category-6 Patch Panels (rack mounted) with RJ45 style connectors, for terminating all twisted pair cable from each Voice/Data/IP outlet served from this location. Provide 25% spare capacity for future wiring requirements. All patch panels shall be 24 or 48-ports maximum. Provide cable support bars at the rear of each patch panel. All cable shall be secured to bars with Velcro straps.
- 2.8 All fiber optic feed cables routed to the IDF locations shall be provided with 20-feet of slack for a service loop mounted on the backboard behind the racks, or stored in the back of the wall mounted cabinets. Contractor shall provide a 24" diameter wall mounted service loop manager for the fiber optic feed cables as manufactured by Leviton #48900-FR. Maximum of (3) fiber feed cables per manager as required to manage all service loops. Provide a 12" diameter service loop manager in the rear of wall mount IDF cabinets by Leviton #48900-FR.

2.9 Cabinets/Racks Redressing Requirements

In compliance the SBCUSD efforts to maximize space, equipment shall be placed as follows:

- 2.9.1 Incoming IDF/LDF Fiber Tray at the top.
- 2.9.2 The 1U 48-port discrete modular patch panel to be positioned below the fiber tray(s).
- 2.9.3 The first switch to be positioned next.
- 2.9.4 The second 1U 48-port modular patch panel follows the first switch.
- 2.9.5 The second switch next.
- 2.9.6 The third 1U 48-port modular patch panel next.
- 2.9.7 Another switch next.
- 2.9.8 And so forth.

IDF UPS Requirements

- 2.10 General UPS Requirements The Contractor shall coordinate with the Division 26 Contractor to properly locate the power outlet connection for the UPS in the IDF Room or Cabinet. The location shown on the floor plans is diagrammatical and does not give the Division 26 Contractor an exact placement. In addition, all UPSs must be furnished with heavy duty mounting bracket kits. A UPS installed in a wall mounted IDF Cabinet must be furnished with a 2-Post kit that can support the full weight of the unit.
- 2.11 Final location for the UPS, within the equipment racks or IDF locations with multiple racks, must be verified by the District IT Director or District Construction Project Manager prior to the installation of the UPS or the electrical outlet for the UPS.
- 2.12 UPS Requirement for an IDF location with (1) 2 or 4-Post equipment racks being installed at the IDF closet:
 - 2.12.1 Provide with a minimum of Four 5-15R and four 5-15/20R outlets.
 - 2.12.2 Provide with Two independently switched single-outlet load banks (one 5-15R and one 5-15/20R)
 - 2.12.3 Provide network interface card Model Optional WEBCARDLX Network Interface option in UPS. Software shall be included with the UPS.
 - 2.12.4 Provide (1) environmental sensor/monitor in each IDF cabinet location. Provide TrippLite Model #ENVIROSENSE monitor unit and connect it to the UPS.

2.12.5 Provide TrippLite Model # SMART2000RMXL2U 120V 2000VA 1920W Line-Interactive UPS with 8 Outlets (or approved equal by APC).

Fiber Optic Patch Cords

- 2.13 Fiber optic patch cords shall be furnished and installed by the Contractor.
- 2.14 All fiber optic patch cords furnished by the Contractor shall match the grade and glass of the fiber optic feed cable installed for the network infrastructure cabling system. The Contractor shall confirm with the District IT Department the type of connector required at the network equipment prior to ordering or installing the patch cords.
- 2.15 Multimode Fiber Optic Patch Cords Parch cords shall be duplex 50/125um, laseroptimized, OM4 (OM4+) grade multimode optical glass. Fiber optic patch cords shall be furnished with LC connectors at the network switch port end and LC connectors at the fiber optic patch panel end. Fiber patch cords shall be furnished with ceramic ferrules. All Multimode patch cords shall be Aqua (Lt. Blue) in color. Patch cords shall be 6-feet (2-meters) 3-feet (1 meter) in length. Provide adequate patch cords to patch all strands of the fiber cables.
- 2.16 Contractor shall be responsible for confirming the network switch connections with the District IT Director prior to ordering or installing the patch cords.

Copper Patch Cords

- 2.17 Copper patch cords shall be furnished and installed by the Contractor.
- 2.18 Provide Augmented Category-6 (Patch Panel End) patch cords with pre-molded boot; provide quantity equal to:
 - 2.18.1 Provide 100% of the total Category-6A cable ports provided on the patch panels.
 - 2.18.2 All patch cords to be installed by Contractor. Provide 100% of total copper patch cords required to be (4) feet in length.
- 2.19 Provide **Augmented Category-6** (Workstation End) patch cords with pre-molded boot, provide quantify equal to:
 - 2.19.1 Provide 100% of the total Category-6A cable drops provided on the patch panels.
 - 2.19.2 All patch cords to be installed by Contractor. Provide 100% of total copper patch cords required to be (10) feet in length, unless otherwise noted.
 - 2.19.3 Patch cords installed at WAP (Wireless Access Point) locations, IP Camera and IP Intercom locations shall be (2) feet in length.
- 2.20 Requirements for all copper patch cords furnished:

- 2.20.1 Color of patch cords shall be determined by the color code indicated above.
- 2.20.2 Patch cords shall as manufactured by Panduit, based on the network infrastructure system furnished by the Contractor.
- 2.20.3 Patch cords furnished must be in compliance with the manufacturer's "Channel" warranty requirements. Patch cords not warranted through the selected manufacturer Channel warranty program will not be approved for use with the network infrastructure.
- 2.20.4 Provide all other items as detailed on the drawings.

Campus Indoor/Outdoor Fiber Optic Feed Cable

- 2.21 Provide one continuous 12 strand fiber optic cable routed from the Main Distribution Frame fiber patch panel to each intermediate Distribution Frame fiber patch panel, and/or other locations as shown on the drawings.
- 2.22 SBCUSD would like to utilize no less than Laser Optimized OM4-rated (defined in TIA-492-AAAD) graded-index Multi Mode Fiber with 850 nm VCSELs (vertical- cavity surfaceemitting lasers) for all backbone cabling where the distance run is 400m or less which is capable of 10Gb/s connectivity from end-to-end. For all distances exceeding 400m, then Single Mode Fiber is to be utilized to achieve 10Gb/s connectivity end-to-end.
- 2.23 Innerduct pathway, as manufactured by Carlon (or approved equivalent) shall be utilized as specifically located on the construction drawings. Plenum rated innerduct for exclusive indoor use shall be required. OSP rated innerduct for exclusive outdoor use shall be required and for instances where the innerduct enters a building for no more than 50'. Indoor/outdoor rated innerduct shall be required for instances where the innerduct will enter a building for more than 50'.
- 2.24 Outdoor Fiber Feed Cable Applications Fiber optic cable shall be rated for indoor/outdoor Plenum rated applications. Construction shall consist of, all dielectric, tight buffer with central strength member, flame retardant PVC or PE jacket, rated OFNR, dry water-blocking compound only, and blank fillers are required. Central tube type fiber will not be considered equal.
- 2.25 Fiber optic feed cables for the data infrastructure must be installed as follows:
 - 2.25.1 Multimode Fiber Optic feed cable runs Fiber optic feed cable containing only Multimode strands shall be installed as a single feed cable. Provide a 12-strand of multimode fiber optic feed cable in a single jacket, as shown on the riser diagram, to the IDF locations.
 - 2.25.2 Feed cables shall be clearly defined and labeled for each system. Provide color coding designations with a different color marker for the multimode and/or single mode fiber feed terminations in the fiber patch panels.

- 2.26 Cable shall contain one or all types of fibers listed below:
 - 2.26.1 Provide Multimode 50/125-micron fiber optic glass, (minimum OM4+ laseroptimized grade, extended distance) for dual mode operation at 850 nm and 1300 nm wave lengths.

2.26.1.1 Maximum attenuation at 3.0dB/km @ 850nm and 1.0dB/km @ 1310nm. Minimum 1-gigabit Ethernet distance guarantee of 1110 meters @ 850nm and 600 meters @ 1300nm. Minimum 10-gigabit Ethernet distance guarantee of 550 meters @ 850nm/1300nm. Fiber shall be ISO-TIA OM4 plus rated.

- 2.26.2 Refer to drawings for cable types required. Refer to acceptable cables section for additional information and approved manufacturers.
- 2.27 Each fiber optic cable shall contain the quantity of strands of optical fibers as detailed on the drawings.
- 2.28 All fibers in a multi-fiber cable shall be fully operational within the required performance characteristics. If any individual fiber does not meet the minimum standards, the entire cable must be replaced, end to end, including connectors, without any additional expense to the customer.
- 2.29 Acceptable cables shall be:

General Cable Multimode – NextGen OM4+ (Type BM)

Above glass types are an example of product names per manufacturer. Confirm requirements for indoor/outdoor, riser and plenum rated cable with riser drawings and site plans. Part numbers for composite style cable will vary greatly. Confirm part numbers with manufacturer.

Augmented Category-6 Station Cable

- 2.30 Contractor shall provide one Augmented Category-6 UTP cable to each Data, Voice, IP Page, Audio-Visual Data Connection, or any other location as indicated on the drawings and specifications. Provide quantity of cables as indicated on the drawings at each location. IP Camera, Wireless Access Points shall require a total of (2) Augmented Category 6 cable to each location unless otherwise noted.
- 2.31 Provide one Augmented Category-6, 4-pair unshielded twisted pair (UTP) cable from the nearest MDF or IDF location to each RJ45 data outlet port indicated on the drawings. Dual port outlets will require two such cables. Four port outlets will require four cables. Refer to the drawing details for jacket color requirements for each type of connections. Color of cable jacket for each type of connection shall be determined by the drawing

details. Confirm color of cable jacket prior to ordering with the District IT Director. Contractor shall be responsible for providing the correct jacket color per the drawings per District Standards.

- 2.32 Unless otherwise shown in drawing details, the color of the Augmented Category 6 UTP cables shall be per District Standard, individually insulated and color coded.
- 2.33 The cable shall be UL or ETL rated and UL verified in compliance with Augmented Category7-6 EIA/TIA standards. Approved cables for Network Infrastructure System:

General Cable− GenSPEED[®] 10 MTP[™] Small Diameter Category 6A Cable (or approved equal)

- 2.34 On projects requiring plenum rated cabling, provide the plenum jacketed version of the type of cable shown in the specifications. Refer to the contract drawing for areas requiring plenum rated cabling.
- 2.35 Where data cables are indicated to run underground, Contractor shall use an Augmented Category-6 OSP-rated cable. Approved cables for Network Infrastructure System:

GenSPEED[®] 10 UTP Indoor/Outdoor Plenum Category 6A Cable

2.36 Contractor shall provide shielded termination products for all drop locations and terminations panels and shall ground all products per manufacturer's instructions and warranty requirements.

IDF to MDF Voice Feed Cables

- 2.37 Provide multi-pair UTP Category-5E cable from each IDF to the MDF, unless otherwise shown on the drawings. Cable must be 24 AWG, 22 AWG conductors will not be approved as an acceptable equal. Refer to the Riser Diagram for size of feed cables to be provided. Cables shall be 25-Pair to each of the IDF locations.
- 2.38 The outside plant cable shall have an aluminum shield, conductors surrounded by FLEXGEL III filling compound (or other water-blocking compound), and have a black polyethylene jacket.
- 2.39 For voice feed cables, terminate all pairs on both ends of the cable on building entrance protectors on the termination blocks. Follow standard voice color codes for termination. Building entrance protectors shall be furnished with a ground wire to the local ground bus in the MDF/IDF Room.
- 2.40 Plug in Surge Protection Modules shall be provided for each pair terminated on the protector chassis. Protector module shall be solid state type unless otherwise noted:

- 2.40.1 240VDC/300VDC solid state protector modules shall provide transient and power fault protection for standard telephone line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with int30VDC/75VDC solid state.
- 2.40.2 30VDC/75FCD solid state protector modules shall provide transient and power fault protection for digital and data line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Red in color.
- 2.40.3 In the event that protector modules are not called out in the drawings, Contractor shall include all costs in base bid to provide the 75v solid state modules w/sneak current protection. Confirm module color with District's Engineer prior to ordering. In all cases, Contractor is responsible to coordinate appropriate module with District prior to ordering material.
- 2.40.4 Approved manufacturers shall include: Circa, Emerson and Marconi.
- 2.41 All voice feed cables will be tagged on the incoming cable with a typed permanent label with information as to its origin, house pair count, and cable destination. All termination blocks shall be labeled with type written labels that fit between the termination blocks (e.g. clear snap-on covers, adhesive labels and holders). Pairs shall be identified a minimum of every 5 pair on the block.
- 2.42 Provide distribution rings for the termination blocks and entrance protectors mounted at the MDF and IDF locations.
- 2.43 Ground and bond feed cables at one end of cable to aluminum shield with approved "bullet bond" type ground lug and #10 AWG green ground wire. Connect ground wire to closet ground buss bar.
- 2.44 Acceptable manufacturers shall be: Superior Essex or equal, for outdoor riser cable applications.
- 2.45 Data Contractor is responsible for providing the District with detailed feed cable documentation as well as identifying all of the physical cable in the MDF and IDF locations. Contractor shall have all installation, termination and documentation of voice feed cable completed and released to the telephone equipment vendor, a minimum of three weeks prior to the cut-over date set by the District.
- 2.46 Data Contractor is responsible for testing port connectivity from the punch blocks in the IDF closets to the main feed cable blocks in the MDF Room. Test all pairs for continuity and polarity. All testing must be completed a minimum of three weeks prior to the cut-over date set by the District.

Augmented Category-6 Outlets

- 2.47 Unshielded twisted pair Augmented Category-6A outlets shall be an RJ45 Enhanced performance type 8-position / 8 conductor modular jacks, and shall comply with Category-6 performance requirements. Provide single port, dual port, four port or quantity as indicated on the floor plans at each outlet location. All outlets shall be wired in an EIA/TIA 568B configuration.
- 2.48 Provide Category-6 inserts, wired for EIA 568B. Provide installation kits for all locations furnished with Category-6 UTP cabling.
- 2.49 Refer to the detail drawings for color of the Category-6 outlets required. Contractor shall be responsible for confirming all color requirements prior to ordering.
- 2.50 Provide the following Category-6 UTP data connector per Network infrastructure warranty requirements:

2.50.1 Panduit MiniCom TX6 Plus Series CJ688TG

- 2.51 Unshielded twisted pair Augmented Category-6 outlets shall be an RJ45 Enhanced performance type 8-position / 8 conductor modular jacks, and shall comply with Augmented Category-6 performance requirements. Provide single port, dual port, four port or quantity as indicated on the floor plans at each outlet location. All outlets shall be wired in an EIA/TIA 568B configuration.
- 2.52 Provide unshielded Augmented Category-6 inserts, wired for EIA 568B. Provide unshielded installation kits for all locations furnished with Augmented Category-6 UTP cabling.
- 2.53 For outlet locations cabled with OSP-rated Augmented Category-6 wire, provide shielded Augmented Category-6 inserts, wired for EIA 568B. Provide shielded installation kits for all locations furnished with OSP-rated Augmented Category-6 UTP cabling. Cable connections must be grounded at the patch panel location.
- 2.54 Refer to the detail drawings for color of the Category-6 outlets required. Contractor shall be responsible for confirming all color requirements prior to ordering.
- 2.55 Provide the following unshielded Augmented Category-6 UTP data connector per Network infrastructure warranty requirements:
 - 2.55.1 Panduit MiniCom TX6 Plus Series CJ688TG(or approved equal by Panduit/Gen Cable).
- 2.56 Provide the following shielded Augmented Category-6 UTP data connector for OSPrated cable ports per Network Infrastructure warranty requirements.
 - 2.56.1 Panduit MiniCom TX6A 10Gig Shielded Series CJ6X88TG

Outlet Faceplates

- 2.57 Provide a two-port faceplate for all one and two port outlet locations. Provide blanks for all unused openings. All Faceplates must be white in color to adhere to SBCUSD standards.
- 2.58 Provide a four-port faceplate for all three and four port outlet locations. Provide blanks for all unused openings.
- 2.59 Provide a six-port faceplate for all five and six port outlet locations. Provide blanks for all unused openings.
- 2.60 All fax/modem locations shall be provided as single port outlets. Requirements shall be the same as a single port data outlet as shown on the Technology Legend.
- 2.61 For single port voice outlet locations intended for wall telephone connections, a wall telephone type faceplate with attachment studs shall be provided. The wall telephone jack shall be 8-pin, RJ45 type and use IDC wire terminations only. Provide Category-6A insert, within stainless steel wall plate faceplate. Provide faceplate from the approved manufacturers listed in the specifications.
- 2.62 Provide single port or dual port Surface mount small surface mounted outlet box for IP Speaker data outlets. Provide surface mount box by Leviton QuickPort Series 41089-xxx or equal by one of the approved manufacturers. Provide Category-6A series insert, in surface box for IP Speaker data locations mounted in the backcan for the speaker as shown in the detail drawings.
- 2.63 Provide single port or dual port Surface mount small surface mounted outlet box for IP Camera data outlets in the J-Box for the camera location. Provide surface mount box by Leviton QuickPort Series 41089-xxx or equal by one of the approved manufacturers. The location shall also be furnished with a blank weather-tight faceplate to protect the data termination until the cameras are installed.
- 2.64 All faceplates and surface mount outlet boxes shall be furnished with label windows. All labeling shall be installed within the label window.
- 2.65 Confirm color of all faceplates prior to ordering. All data outlet faceplates shall have a unique sequential identification number applied to faceplate. Hand written labels are not permitted. All color schemes shall be approved by the customer prior to installation.
- 2.66 Colored inserts are required for this project. Refer to the detail drawings for the exact color scheme to be provided. Inserts submitted that do not follow the color and identification requirements will be rejected. Inserts installed that do not follow the color coding as shown in the detail drawings will be replaced at the Contractor's expense.

- 2.67 All labels will be installed under label window. Labels adhered to the surface of the faceplate will not be accepted. Contractor must provide clear laminating type of cover material over the surface mounted labels where used.
- 2.68 Reference the drawings for special outlet configurations or plate requirements.

PART 3 – IP NETWORK COMPATIBLE INTERCOM (IX SYSTEM) GENERAL

- 3.1 SECTION INCLUDES
 - 3.1.1 IP Video Intercom. (Aiphone IX Series s system)

3.2 REFERENCES

- 3.2.1 Standards Institute (ANSI/TIA/EIA) 568 Commercial Building Telecommunications Cabling Standard.
- 3.2.2 International Organization for Standards (ISO) 9001:2000 Quality Management Systems Requirements.
- 3.3 SYSTEM DESCRIPTION
 - 3.3.1 IP Network Compatible Video Intercom System: A network-based communication and security system featuring video entry security, internal communication, emergency stations, and paging. All units and app in the systems shall be able to view and assist onsite visitors from an offsite location, broadcast emergency announcements, and communicate using a PoE network.
 - 3.3.1.1 Power Source: Power over Ethernet (802.3af).
 - 3.3.1.2 Network Interface: 10 BASE-T / 100 BASE-TX Ethernet CAT 6a (RJ-45).
 - 3.3.1.3 Network Protocols: IPv4, IPv6, TCP, UDP, SIP, HTTP, HTTPS, MJPEG, RTSP, RTP, RTCP, IGMP, MLD, SMTP, DHCP, NTP, DNS.
 - 3.3.2 Bandwidth Usage:
 - 3.3.2.1 G.711: 64Kbps x 2 per video call.
 - 3.3.2.2 64Kbps per monitor.
 - 3.3.2.3 H.264: 24Kbps ~ 2,048Kbps.
 - 3.3.3 Communication: Hands-free (VOX), push-to-talk (simplex), or handset (full-duplex).
 - 3.3.4 Video Display: 7 inches color LCD.

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- 3.3.5 Camera: Type:
 - 3.3.5.1 1/4 inch (6 mm) color CMOS.
 - 3.3.5.2 View Area: 2 feet 2 inches (660 mm) vertical x 3 feet 1 inch (940 mm) horizontal at 20 inches (508 mm).
 - 3.3.5.3 Resolution: VGA or higher
- 3.3.6 Video Stream: ONVIF Profile S.
- 3.3.7 Power Source for electric strike: Atop AD1048-24FS 48W/24DIN-Rail 24V DC.
- 3.3.8 Wire Type: CAT-6a. (District standard: Panduit)
- 3.3.9 Distance:
 - 3.3.9.1 Base Bid to include up to 100 l. f. of cabling
 - 3.3.9.2 Maximum allowable to any station to Network Node: not to exceed 330 feet (100 meters).
- 3.4 SUBMITTALS
 - 3.4.1 Submit under provisions of Section 01 30 00 Administrative Requirements.
 - 3.4.2 Product Data: Manufacturer's data sheets on each product to be used, including:
 - 3.4.2.1 Preparation instructions and recommendations.
 - 3.4.2.2 Storage and handling requirements and recommendations.
 - 3.4.2.3 Installation methods.
- 3.5 Shop Drawings: Submit the following:
 - 3.5.1 Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
 - 3.5.2 Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
 - 3.5.3 Installation and Operation Manuals:
 - 3.5.3.1 Submit manufacturer's installation and operation manual, including operation instructions and component wiring diagrams.

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- 3.5.3.2 Provide detailed information required for Owner to properly operate equipment.
- 3.6 Warranty: Submit manufacturer's standard warranty.
- 3.7 QUALITY ASSURANCE
 - 3.7.1 Manufacturer Qualifications: ISO 9001:2008 certified company.
 - 3.7.2 Installer Qualifications: Factory trained and experienced with system installations of scope and size required for the Project.
 - 3.7.3 Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
 - 3.7.4 Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
 - 3.7.5 Handling: Protect materials during handling and installation to prevent damage.

3.8 PROJECT CONDITIONS

3.8.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

3.9 MANUFACTURERS

- 3.9.1 IP Video Intercom System: IX Series Intercom System as manufactured by Aiphone Corporation. Web site: www.aiphone.com
- 3.9.2 Requests for substitutions will be considered in accordance with provisions of Document 00 43 25 Substitution Request Form During Procurement.

3.10 SYSTEM DESIGN

- 3.11 Master Station(s): Provide one master station at each campus.
- 3.12 Aiphone Model IX-MV7-HW Provide one per campus at designated location.
- 3.13 Audio Video Door Stations:
- 3.14 Model IX-DA Surface Mount: Provide one per campus at designated location.
 - or

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- 3.15 Model IX-DF Flush Mount: Provide one per campus at designated location.
- 3.16 Option: Model IX-DV Surface Mount.
- 3.17 Signage:
 - 3.17.1 At each Door Station/Wall Box Contractor shall provide weatherproof signage Signage: "ASSISTANCE" (English) and "ASISTENCIA" (Spanish).
- 3.18 Functional Components: As indicated on the drawings or as required to complete system.
 - 3.18.1 Video Master Station Model IX-MV7-HW:
 - 3.18.1.1 An IP addressable video master station with a 7 inch color LCD monitor. It can be wall or desk mounted (desk stand included. This station requires a 802.3af compliant Power-over-Ethernet network.
 - 3.18.2 Audio/Video Door Station: Model IX-DA, IX-DF, or IX-DV

3.18.2.1 Station connects to a PoE network using CAT-6a cable.

- 3.19 Optional Components (Unit price items to be used at District option):
 - 3.19.1.1 RY-IP44 IP Programmable Relay Adaptor:
 - 3.19.1.2 45 Degree Mullion Mounting Bracket Model KMB-45:
 - 3.19.1.3 Stainless Steel Security Lock Box Model LB-SDVF: for IX-DF, IX-DF-HID, & IX-DF-RP10.
 - 3.19.1.4 Stainless Steel Enclosure Model SBX-ISDVF:
 - 3.19.1.5 18-Guage stainless steel enclosure designed for surface mounting the IX-DF door stations.
- 3.20 EXECUTION
 - 3.20.1 Examine areas to receive integrated security and communication system.
 - 3.20.2 Notify District of conditions that would adversely affect installation or subsequent use.
 - 3.20.3 Do not begin installation until unacceptable conditions are corrected.
- 3.21 PREPARATION

3.21.1 Verify the following compliance before starting installation.

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- 3.21.2 The unit turns inoperative during power failure.
- 3.21.3 Keep the intercom wires at least 1 foot (30 cm) away from strong electrical wiring (AC 100-240 V) including, in particular, wiring for inverter electrical appliances. Noise and malfunction could result.
- 3.21.4 If a strong light shines on the main unit screen, the picture may turn white or only silhouettes will be visible.
- 3.21.5 Other manufacturer's devices (such as sensor, detectors) used with this system, comply with the manufacturer's installation requirements.
- 3.21.6 The LCD panel is manufactured with very high precision techniques, inevitably will have a very small portion of its picture elements always lit or not lit at all. This is not considered a unit malfunction. Please be aware of this in advance.

3.22 INSTALLATION

- 3.22.1 Install integrated security and communication system in accordance with manufacturer's instructions at locations indicated on the Drawings.
- 3.22.2 Mount equipment plumb, level, square, and secure. For video entrance stations and video door stations, comply with manufacturer's design requirements to provide optimum picture quality of station monitoring.

3.23 SET-UP AND ADJUSTING

3.23.1 Adjust integrated security and communication system for proper operation in accordance with manufacturer's instructions.

3.24 DEMONSTRATION AND TRAINING

- 3.24.1 Demonstration:
 - 3.24.1.1 Demonstrate that integrated security and communication system functions properly.
 - 3.24.1.2 Perform demonstration at final system inspection by qualified representative of manufacturer.
- 3.24.2 Instruction and Training:
 - 3.24.2.1 Provide instruction and training of Owner's personnel as required for operation of integrated security and communication system.

- 3.24.2.2 Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
- 3.24.2.3 Provide instruction and training by qualified representative of manufacturer.
- 3.24.2.4 Provide DVD copy of video recorded training session(s)
- 3.25 PROTECTION
 - 3.25.1 Protect installed integrated security and communication system from damage during construction.

PART 4 – Video Security Systems

- 4.1 (2) Augmented Category-6 UTP cables shall be provided from the IDF closet to each camera location. All cables installed in underground conduit shall be rated for Wet Location.
- 4.2 Provide (Ornage) Category-6 patch cords with pre-molded boot, provide quantity equal to 100% of the total camera cable drops or ports provided. All patch cords to be installed by Contractor. Provide a total of 100% of the patch cords 36 inches in length. Patch cords shall be in compliance with the manufacturer's "Link" warranty requirements. Provide patch cords for both ends of the cable.

PART 5 – WIRELESS ACCESS POINTS (WAP)

- 5.1 The Contractor will provide all Cisco manufactured wireless access point; programming will be done by the District IT Department. The Contractor shall install each Wireless access point as required and provide patch cord installation at the WAP. The Contractor shall provide a list including the room number, location, and MAC address of each device installed to the District IT Department. Provide minimum 10' slack cable at each WAP location.
- 5.2 Interior wall mounted Access Points shall be installed on hard surface walls. In these instances a wall mount Access Point bracket, such as manufactured by Precision Enclosure Solutions (PES) (or approved equivalent) or wall mount enclosure, such as manufactured by TerraWave (or approved equivalent) shall be utilized.
- 5.3 Refer to drawing details for installation requirements for WAP locations.
- 5.4 Contractor shall provide all WAPS and antennas for all Exterior WAP locations shown on the drawings. Antennas and mounting brackets such as manufactured by TerraWave (or approved equivalent) by Cisco

PART 6 – INSTALLATION

- 6.1 Upon completion of 10% of the cabling installation, the Contractor shall notify the Project Engineer for an inspection of the methods and types of materials used on the project. The Contractor shall give a minimum of 72 hours notification to the Project Engineer for the scheduling of the inspection. The Contractor will be given a written review of the findings, so if adjustments are required, they can be done before the project proceeds. The Contractor shall be responsible for adhering to the findings and a follow-up inspection will not be provided.
- 6.2 Pull strings shall be provided with all cable runs including but not limited to: conduit stub ups, conduit sleeves, cable trays, open wiring routes, innerduct and point-to-point conduits. Pull strings shall be free from cable bundles in open wiring routes. Pull strings shall not be substituted for pull ropes for the exterior site conduits.
- 6.3 Velcro cable management straps are required on all Category-6 cable bundles, the last 20 feet or upon entry into equipment closet, a maximum of 12" apart. Cable bundles shall also be routed through cable managements or "D" rings in the equipment closet.
- 6.4 Data Contractor shall supply protective bushings or slide on rings at the ends of all exposed conduits used for data system cabling. This is to include all conduits installed for any future data cabling requirements. Contractor shall submit planned protection bushings prior to installation of cabling for approval.
- 6.5 Velcro cable management straps are required on the cabling in the rear section of the vertical managers in the equipment racks. Straps shall be a maximum of 12" apart. At a minimum, Velcro straps shall be provided at each point the cables are routed to the patch panels from the main bundle.
- 6.6 Every fiber in every fiber optic cable must be terminated at both ends of a fiber patch panel in the MDF/IDF closet or cabinet location. Termination shall be accomplished using the correct style of connectors as directed by the District with a strain relief boot. All connectors shall be of the same manufacture to ensure compatibility. Polarity of fiber strands must be observed at all times.
- 6.7 Labeling
 - 6.7.1 Each cable run shall be permanently labeled at each end with a unique sequential number which corresponds to a similar number provided for each data outlet and patch panel point. A printed label shall be placed at each of the following locations:
 - 6.7.1.1 On the cable at the rear of the patch panel or termination block. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).

- 6.7.1.2 On each cable in the j-box behind the faceplate location. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).
- 6.7.1.3 On the cable at the terminal strip prior to termination point. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).
- 6.7.1.4 On the face of the patch panel, provide a ¾" by ¾" label with a letter or number identifying the patch panel designation. For special purpose data connections such as WAP, Audio-Visual, IP Page and IP Camera ports, the label shall be designated with colored label icon or marker.
- 6.7.1.5 On the face of the faceplate in the label holder window. The label shall be clearly defined with a minimum #10 font size.
- 6.7.2 Handwritten labels are not permitted. Where cable ID includes room number identification, the Contractor shall obtain written verification of final room numbers prior to beginning labeling (numbers on plans do not always match final room numbers). Cable pulling cross reference lists will not be accepted with final documentation.
- 6.7.3 Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.
- 6.7.4 All faceplates shall be identified with permanent printed labels. Labels must not be subject to removal by incidental contact. Contractor shall be responsible for replacing defective labeling for a period of one year from date of final sign-off of project.
- 6.7.5 All fiber optic and UTP feed cables shall be identified with permanent, water resistant, printed labels. Labeling information shall include closet identifications, quantity of conductors (UTP) or strands (fiber) and house pair designations (UTP). Cables shall be labeled in the IDF/MDF closets at the site conduit entrance point, riser conduit entrance point and prior to entering either punch blocks or patch panels. Labels for fiber and copper feeds shall include both the name of the origination point and the destination point, house pair or house fiber strand count, cable composition (i.e., 12-Strand MM 50/125 LO; 6-Stand SM). See details for additional requirements.
- 6.7.6 Labeling will follow recommended EIA/TIA standards or as requested by the customer. Contractor will confirm labeling pattern prior to final identification or testing. All test results will be identified by the final labeling scheme. Contractor

shall be required to have the labeling scheme approved in writing by the District IT Director prior to manufacture or installation of the labeling.

- 6.7.7 All fiber optic cables and/or innerduct shall be tagged with fiber optic warning tags in every manhole or pullbox. Fiber warning tags shall also be placed at each end of the cable in the termination closets in clear view. A minimum of (3) tags are required at each end, with a label tag on each cable in the service loop. Fiber warning tags shall be placed on fiber optic cable and/or innerduct routed through open ceiling environments at increments no less than 15 feet apart.
- 6.7.8 Refer to detail drawings for additional labeling requirements.
- 6.8 Where open wiring cables are run through the ceiling space (only permitted where specifically noted on the drawings), the wire shall be bundled together and supported above the ceiling.
- 6.9 All cables must be fastened to the building structure via "j-hooks" or an approved Category 6 suspension system, and not directly in contact with ceiling system. For "j-hooks" maximum fill capacity is as follows: 1-5/16" hooks 35 cables; 2" hooks 60 cables; 4" hooks 120 cables. For quantities beyond 120 cables, use a sling support system such as "Erico Cable Cat" or equal. Maximum fill capacity 200 cables. D-rings, "Caddy #WMX cable hangar", "Caddy Bridle Rings", drive rings or any other type of wire ring support is not allowed.
- 6.10 Where cables pass through a fire-resistant portion of the structure, conduit sleeves shall be provided to maintain the rating of wall penetrated. Sealing of all penetrations with an approved fire barrier is required. Conduits and sleeves must remain accessible for future use. Permanent sealants may not be used to seal sleeves and conduits.
 - 6.10.1 The 27 10 00 Contractor shall be responsible for fire-stopping all unused conduit sleeves in the ceiling or through rated walls. The Electrical Contractor shall be responsible for fire-stopping around the conduit or sleeve, unless the sleeve is installed by the 27 10 00 Contractor, in which case, the 27 10 00 Contractor shall be responsible for all fire-stopping requirements.
 - 6.10.2 Expanding foam is not an acceptable sealant for any conduit opening. Contractor shall be responsible for complete replacement of the conduit and cabling in any conduit filled with expanding foam used as a sealant.
- 6.11 Fiber optic feed cables connecting to equipment racks from the MDF Room or from an adjacent IDF location, shall be installed with not less than a 20-foot service loop between the rack and mounted on the backboard. See drawings for fiber optic service loop requirements.
- 6.12 Provide 6 inches of cable slack at computer data system outlets inside conduit box.

- 6.13 In an accessible ceiling area, provide a 10-foot (stored in a Figure-8 configuration) service loop above the all data/voice outlet locations. Service loop must be securely tied up off of ceiling tiles or ceiling surface and supported at two opposite points. Neatly coil cable without exceeding minimum bend radius limitations. Do not provide length in excess of 15 feet, as it may cause improper test results and errors.
- 6.14 Do not provide a service loop in the MDF/IDF Room on the UTP cables, unless otherwise noted. Cables shall be neatly routed around the perimeter of the room to the cable runway from the point of entrance into the room.
- 6.15 The minimum bending radius for all cables and the maximum pulling tension shall not exceed manufacturer's recommendations.
- 6.16 Cables installed in manholes and pullboxes shall be supported with Velcro ties or loosely fitted UV rated tie wraps, on wall mounted cable support racks. The cables shall be clearly labeled in the manhole or pullbox.
- 6.17 Provide a full 360-degree loop of slack cable around manhole and pullbox interiors. Cables entering handholes from the bottom, shall not be allowed to touch the bottom of the cover when closed and shall not be pinched or crushed in any way.
- 6.18 Cable pulling shall use a split mesh grip over the cable jacket. Connection directly to optical fibers and copper wire conductors shall not occur.
- 6.19 When pulled through conduits, cable pulling lubricants shall be continuously applied to all cables and be specifically approved by the manufacturer.
- 6.20 Where cables are pulled through or pulled from a center run, pull without splices or terminations, lead out the cables at all manholes, pullboxes, and conduits, taking care to feed them in again by hand for the next run.
- 6.21 For each cable pull where a cable direction change is required, flexible feed-in tubes, pullout devices, multi-segmented sheaves, etc., shall be used to ensure proper cable pulling tension and side wall pressures. Cables shall not be pulled directly around a short right-angle bend. Any device or surface the cable comes in contact with when under pull-in tension shall have a minimum radius 50% greater than the final specified minimum installed cable bending radius. The maximum possible size radius sheaves and feed-in tubes, usable in the available working space shall be provided in all situations, to ensure the minimum possible cable sidewall pulling pressure. Do not use devices with multi-segment "roller" type sheaves.
- 6.22 Cable lengths over 250 feet shall be machine pulled, not hand pulled. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum pulling speed shall be greater than 15 feet per minute.

- 6.23 A pull string shall be placed with all UTP and paging station cables at the time of installation. Conduit runs and surface raceway for station cabling shall be furnished with a minimum 2-Ply spiral wrap style, pull string rated for 240 ft/lbs. pulling strength, such as manufactured by Greelee #431 or approved equal. Includes all conduit stubs and cables routed through open ceiling and cable trays. Pull strings shall be tied off in the junction box and in the ceiling. Provision for the installation of the pulls string shall apply to all empty and spare conduits as well. Single ply type pull string will not be accepted as a substitute for the 2-ply pull string.
- 6.24 A measuring pull tape shall be placed with all feed cables at the time of installation. Indoor riser and outdoor conduit runs between buildings designated for feed cabling, in excess of 150 feet shall be provided with a minimum ½" polyaramid style, measuring true tape pull string annotated with footage increments rated for 2500 ft/lbs. pulling strength, such as manufactured by Greenlee #39245 or approved equal. Conduit runs less than 150 feet shall be furnished with a ¼" polyaramid style, measuring true tape pull string annotated with footage increments rated for 1250 ft/lbs. pulling strength, such as manufactured by Greenlee #39243 or approved equal. Provision for the installation of the measuring pull tape shall apply to all empty and spare conduits as well. Standard twine style pull strings and standard nylon or polypropylene style pull ropes will not be accepted as a substitute for the polyaramid measuring tape pull string.
- 6.25 When pulling cable through conduit, cables shall be pulled straight into or out of the raceway without bends at the raceway entrance or exit. Pull in cable from the end having the sharpest bend (i.e., bend shall be closest to the reel). Keep pulling tension to minimum by liberal use of lubricant, hand turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one at manhole or pullbox during this operation. Cables shall be pulled directly from cable reels.
- 6.26 All cables shall be new and extend continuous from each MDF or IDF backboard or rack to all outlet locations.
- 6.27 Where cables are not installed in a conduit or other raceway system, they shall not be routed parallel with other line voltage equipment or wiring (120 volt and above) with 36" or within 12" of line voltage equipment or wiring where crossing.
- 6.28 Where OSP-Rated UTP cables or OSP-Rated fiber optic cables are routed exposed through ceiling for more than 50'-0", Contractor shall install the cable in innerduct or EMT conduit in the ceiling. Innerduct installed in the accessible ceiling space shall be a minimum of riser rated and minimum of 1" in diameter. Innerduct shall be supported minimum of every 3-feet to the structural members.

PART 7 - TESTING

7.1 All Category-6 cables shall be point to point (link) tested after installation/termination and verified to operate at minimum 1000Mbps. Performance of installed cables shall satisfy all current addendums to the EIA/TIA 568A standard for Category-6 wiring. In addition, testing shall satisfy all proposed amendments to the existing ISO/IEC requirements. The wiring shall support all specified communication protocols. Testing shall support the Category-6 requirements by the EIA/TIA.

- 7.2 Upon completion of testing cable links for both copper and fiber optic cabling, the Contractor shall supply a copy of the original database files downloaded from the tester in original format on a USB Flash Drive. Contractor shall provide with the testing database files, an original copy of the tester's manufacturer software program (included in original cost) for record management and archiving, in a Windows format (i.e., Fluke Linkware software program).
 - 7.2.1 The manufacturer's software program will be used by the Project Engineer to review all test results, and then turned over to the District to keep as their record copy with the final approved test results. Provide (3) copies of tests on USB Flash Drives. Do not submit test results for review in Excel or PDF file formats, as the submittal will be rejected and not reviewed.
- 7.3 Contractor will repair or replace cable runs or connecting hardware that do not meet specified criteria.
- 7.4 Upon completion of submittal of original test results, and after review and approval of those results, the Contractor shall provide testing equipment and personnel to randomly re-test 10% or 20 drops minimum, whichever is greater, of all UTP cable locations on the campus in the presence of the designated District Representative and Project Engineer. The District Representative shall choose which cables are to be retested. If 10% of the re-tested cables fail to match the previously submitted original tests, the Contractor must hire an independent testing firm to re-test all UTP cable on the campus, at no cost the customer. All cables which do not meet the specifications criteria as determined by the independent test report, shall be replaced and re-tested by the Contractor at no cost the District. Final sign-off of the testing shall be approved after receipt of all other documentation.
- 7.5 Multimode fiber optic cables shall be tested bi-directionally at 850nm and 1300nm. Single mode fiber optic cable shall be tested bi-directionally at 1310nm and 1500nm. All fiber strands shall be tested with an OTDR (Optical Time Domain Reflectometer). All fiber test results shall contain final source and destination information that matches IDF or MDF labeling shown on the fiber optic patch panels and final documentation. OTDR tests results shall be included with the copper test results and submitted with the tester's software for review. Do not submit test results for review in Excel or PDF file formats, as the submittal will be rejected and not reviewed.
- 7.6 Test procedures shall comply with EIA/TIA 526-14 Method B. Test results shall meet the minimum following criteria:

- 7.6.1 Fiber optic test results shall not exceed 2db total attenuation loss in addition to inherent loss published by manufacturer tested at minimum 2000 Mhx for 805nm and 500 Mhz for 1300nm for the fiber optic cable.
- 7.7 End to end attenuation Fiber Optic feed cabling testing shall be performed with a temporary test jumper cable at each end of the installed fiber cable. The test jumper utilized shall be the same fiber core size and grade of glass as the installed cable. The measured attenuation of the test jumpers, test connectors, and test interconnection sleeve between the two test jumpers shall be less than 1dB as calibrated at the time of the test at indicated wave lengths and frequencies. Test jumpers shall be "zeroed out" before testing of fiber stands begins.
- 7.8 Final As-Built Drawing Submittals Provide (1) hard bound copy of "E-size" As-Built drawings and (3) copies on USB Flash Drive in AutoCad (2014 or newer version) format. A Hand marked-up copy of the original construction drawings will not be accepted as the final As-Built drawing submittal. Final As-Builts shall include copies of the floor plan drawings of each building, detailed elevations of each MDF or IDF locating all equipment, quantities outlets and speaker locations, locations of all sleeves and identification of all final cable routes. In addition, the drawings shall include all outlet locations with cable identification numbers.

END OF SECTION

SECTION 28 13 00

ACCESS CONTROL

PART 1 - GENERAL

1.1. SUMMARY

1.1.1.Field installed door access controllers, card readers, contacts, electronic strike connections and field installed cabling connecting all components, basic programming of all components on site and providing a direct Ethernet connection from each controller to the district Central Station door access control network.

1.2. RELATED SPECIFICATION SECTIONS:

- 1.2.1.Division 26 05 33 Conduit and Fittings
- 1.2.2.Division 26 05 19 or 26 05 13 Conductors
- 1.2.3. Division 26 05 34 Outlet and Junction Boxes

1.3. BIDDER QUALIFICATIONS

- 1.3.1.Successful bidder will provide a complete, operational electronic access control system without regard to specific components that may not be called out in this document.
- 1.3.2. Successful bidder will have a current C-10 license provided by the State of California
- 1.3.3.Success bidder will be an authorized Identicard Maxxess dealer that has successfully completed all factory trainings to maintain that dealership.

1.4. REFERENCES

- 1.4.1.The following reference standards and model code documents shall be used in estimating and detailing door hardware, and shall considered as a standard of quality, function, and performance, as applicable:
 - 1.4.1.1. I.B.C. Current Adopted edition for construction documents.
 - 1.4.1.2. NFPA-80 Fire Doors & Windows (current year adopted).
 - 1.4.1.3. NFPA-101 Life Safety Code (current year adopted).
 - 1.4.1.4. NFPA-105 Smoke Control Door Assembly. (current year adopted)
 - 1.4.1.5. ANSI-117.1 1992 Edition Providing Accessibility and Usability for Physically Handicapped People.
 - 1.4.1.6. A.D.A.A.G Americans with Disabilities Act Accessibility Guidelines.

1.4.2.DEFINITIONS

1.4.2.1.	DEFINITIONS	
1.4.2.1.1.	API: Application Programming Interface	
1.4.2.1.2.	AVI: Audio Video Interleave	
1.4.2.1.3.	CA: Certificate Authority	
1.4.2.1.4.	CAC: Common Access Card	
1.4.2.1.5.	CE: European Union Conformity	

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1.4.2.1.6.	CPU: Central Processing Unit	
1.4.2.1.7.	CSV: Comma Separated Values	
1.4.2.1.8.	DNS: Domain Name Server	
1.4.2.1.9.	DSM: Door Status Monitor	
1.4.2.1.10.	DVR: Digital Video Recorder	
1.4.2.1.11.	EACS: Electronic Access Control System	
1.4.2.1.12.	EPS: Events Per Second	
1.4.2.1.13.	FCC: Federal Communications Commission	
1.4.2.1.14.	FIPS: Federal Information Processing Standard	
1.4.2.1.15.	FIFO: First In – First Out	
1.4.2.1.16.	FTP: File Transfer Protocol	
1.4.2.1.17.	FRAC: First Responder Authentication Credential	
1.4.2.1.18.	GB: Gigabyte	
1.4.2.1.19.	GSOC: Global Security Operations Center	
1.4.2.1.20.	HA: High Availability	
1.4.2.1.21.	HTML: Hypertext Markup Language	
1.4.2.1.22.	H.264: Video Compression Standard	
1.4.2.1.23.	I ² C: Inter-Integrated Circuit	
1.4.2.1.24.	IEEE: Institute of Electrical and Electronics Engineers	
1.4.2.1.25.	I/O: Input/Output	
1.4.2.1.26.	IP: Internet protocol	
1.4.2.1.27.	IS: Integrated System	
1.4.2.1.28.	JPEG: Joint Photographic Experts Group	
1.4.2.1.29.	LAN: Local area network	
1.4.2.1.30.	LDAP: Lightweight Directory Access Protocol	
1.4.2.1.31.	MB: Megabyte	
1.4.2.1.32.	MJPEG: Motion JPEG	
1.4.2.1.33.	MSATA: Mini-Serial Advanced Technology Attachment	
1.4.2.1.34.	MSO: Mobile Security Officer	
1.4.2.1.35.	MTBF: Mean-Time Between Failure	
1.4.2.1.36.	NAS: Network Attached Storage	
1.4.2.1.37.	NBAPI: NetBox Application Programming Interface	
1.4.2.1.38.	NECA: National Electric Code Association	
1.4.2.1.39.	NFPA: National Fire Protection Association	
1.4.2.1.40.	NVR: Network Video Recorder	
1.4.2.1.41.	ODBC: Open Database Connectivity	
1.4.2.1.42.	OS: Operating System	
1.4.2.1.43.	OVID: Open Video Integration Driver	
1.4.2.1.44.	PDF: Portable Document Format	
1.4.2.1.45.	PIN: Personal Identification Number	
1.4.2.1.46.	PIV: Personal Identity Verification	
1.4.2.1.47.	PoE: Power over Ethernet	
1.4.2.1.48.	PTZ: Pan-tilt-zoom	
1.4.2.1.49.	RAID: Redundant Array of Inexpensive Disks	
1.4.2.1.50.	RAM: Random Access Memory	

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1.4.2.1.51.	REX: Request to Exit
1.4.2.1.52.	RFID: Radio Frequency Identification
1.4.2.1.53.	RoHS: Restriction of Hazardous Substances
1.4.2.1.54.	ROM: Read Only Memory
1.4.2.1.55.	RU: Rack Unit
1.4.2.1.56.	SFTP: Secure File Transfer Protocol
1.4.2.1.57.	SHA: Secure Hash Algorithm
1.4.2.1.58.	SIO: Serial Input/Output
1.4.2.1.59.	SLA: Sealed Lead-Acid
1.4.2.1.60.	SMS: Security Management System or Short Message Service (text
	messaging)
1.4.2.1.61.	SSL: Secure Sockets Layer
1.4.2.1.62.	SUSP: Software Upgrade and Support Plan
1.4.2.1.63.	TCP: Transmission control protocol - connects hosts on the Internet
1.4.2.1.64.	TIA: Telecommunications Industry Association
1.4.2.1.65.	TWIC: Transportation Worker Identification Credential
1.4.2.1.66.	UI: User Interface
1.4.2.1.67.	UPS: Uninterruptible power supply
1.4.2.1.68.	UTP: Unshielded Twisted Pair
1.4.2.1.69.	VMS: Video Management System
1.4.2.1.70.	WAN: Wide area network
1.4.2.1.71.	Wi-Fi: Wireless Network

1.5. SUBMITTALS

- 1.5.1.Product Data: Provide a catalog cut sheet, clearly marked and identified, illustrating and describing each product included in the Access Control Schedule.
 - 1.5.1.1. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 1.5.1.2. Formulate catalog cut sheets into sets and include a set with each copy of the Hardware Schedule submitted.
- 1.5.2.Access Control Schedule: Prepared by or under the supervision of Access Control Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1.5.2.1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Access Control Schedule.(ACS)"
 - 1.5.2.2. Organization: Organize the ACS Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Coordinate ACS Schedule with Section 08 7100. DO NOT DUPLICATE PRODUCT CALLED OUT IN SECTION 08 7100
 - 1.5.2.3. Content: Include the following information:
 - 1.5.2.3.1. Type, style, function, size, label, hand, and finish of each ACS item.

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- 1.5.2.3.2. Complete designations of every item required for each door or opening including name and manufacturer.
- 1.5.2.3.3. Fastenings and other pertinent information.
- 1.5.2.3.4. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule. Use same scheduling sequence and format and use same door numbers and hardware set numbers as in the Contract Documents.
- 1.5.2.3.5. Explanation of abbreviations, symbols, and codes contained in schedule.
- 1.5.2.3.6. Mounting locations for Access Control System product.
- 1.5.2.3.7. Access Control System product sizes and materials.
- 1.5.2.3.8. Verify the Section 08 710 Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems. Notify Architect and Owner Representative if operational description does not meet the need and provide corrected description
- 1.5.2.4. Submittal Sequence: Submit the final Access Control System at earliest possible date, particularly where approval of the Access Control System must precede fabrication of other Work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Access Control Schedule.
- 1.5.3.Wiring Diagrams: Verify the Section 08 7100 for all electrified hardware items specified for this Project, If Section 08 7100 is not correct, provide complete wiring diagrams along with riser drawings and elevations, showing locations where such material is to be installed. Wiring Diagrams shall be submitted with Hardware Schedule. Verify and coordinate with the electrical systems installer.
 - 1.5.3.1. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- 1.5.4.Keying: Verify with Section 08 7100 all keying will function properly with the Access Control System devices.
- 1.5.5.Operation and Maintenance Data: For each type of Access Control door include in maintenance manuals. Provide latest, revised and updated schedule of Access Control System devices, cut sheets, and project schedule. In addition, furnish one (1) copy of maintenance and parts manuals for those items for which they are readily available and normally provided.

1.6. QUALITY ASSURANCE

- 1.6.1.Installer Qualifications: Minimum of two (2) experienced and certified installers who have completed ACS material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance for a minimum of 5-years. Submit copies of the Certificates of Completion for the ACS platform being submitted.
- 1.6.2.Source Limitations: Obtain each type and variety of Access Control System hardware from a single manufacturer, unless otherwise indicated.

- 1.6.3.Fire-Rated Door Assemblies: Provide ACS hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- 1.6.4.Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- 1.6.5.Access Control System contractor with physical location for technical staff within 130 miles of the project. Submit copies of State issued driver's license for installation technicians.
- 1.7. DELIVERY, STORAGE, AND HANDLING
 - 1.7.1.Marking and Packaging: All items of hardware shall be delivered to the site in manufacturer's original cartons or boxes. Mark each box with hardware heading and door number according to approved hardware schedule.
 - 1.7.2. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation: Provide a complete packing list showing items, door numbers and hardware headings with each shipment.
 - 1.7.3.Store hardware in shipping cartons above ground and under cover to prevent damage. Provide secure lockup for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable -so that completion of the Work will not be delayed by hardware losses both before and after installation
 - 1.7.4.Aluminum Door Hardware: Coordinate with Section 08 4313 for all Access Control System hardware prior to Aluminum Door Hardware Delivery. Deliver hardware for aluminum doors as directed by the door supplier for installation by Section 08 4313.
- 1.8. COORDINATION
 - 1.8.1.Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
 - 1.8.2.Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system, as applicable.
 - 1.8.3.Pre-Installation meetings with Electrical Contractor for all associated cable for the ACS and with the Door Hardware Contractor to insure requested door operation by owner.

2. PRODUCTS

2.1. MANUFACTURERS

- 2.1.1.Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Access Control Schedule" Article. Products are identified by using door hardware designations, as follows:
 - 2.1.1.1. Provide the materials or products indicated by trade names, manufacturer's name, or catalog number.
 - 2.1.1.2. Provide manufacturer's standard products meeting the design intent of this Specification, free of imperfections affecting appearance or serviceability.
 - 2.1.1.3. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

2.2. SPECIAL REQUIREMENTS

- 2.2.1.Electrified Locksets:
 - 2.2.1.1. All locksets to be grade 1 heavy duty mortise. Refer to Section 08 7100 and ACS below for electrified locksets
 - 2.2.1.2. Terminate, test, and commission all electrified locksets
 - 2.2.1.3. Provide all manufacturer recommended cable for Electrified Lockset and Intelligent Integrated Access Control Locks
- 2.2.2.Electrified Exit Devices:
 - 2.2.2.1. Refer to Section 08 7100 and ACS below for all electrified exit devices
 - 2.2.2.2. Terminate, test, and commission all electrified openings
 - 2.2.2.3. Provide all manufacturer recommended cable to electrified exit devices

2.2.3.Card readers:

- 2.2.3.1. Coordinate with Section 08 7100 for all card reader locations and operation. DO NOT DUPLICATE card readers call out in section 08 7100
- 2.2.3.2. Mount readers no more than 36" from finished floor.
- 2.2.3.3. Provide all manufacturer recommended cable for card readers
- 2.2.3.4. Terminate, test, and commission all card reader

2.2.4.Integrated Access Control Locks

- 2.2.4.1. Coordinate with Section 08 7100 for all integrated access control lock locations, description of operation.
- 2.2.4.2. Terminate, test, and commission all Integrated Access Control Locks
- 2.2.4.3. Provide all manufacturer recommended cable for Integrated access control locks unless connected to Owner Supplied Local Area Network (LAN) and then coordinate IP address(es) required from Owner Representative.
- 2.2.5.ACS control panels
 - 2.2.5.1. Coordinate with Electrical Contractor for all for rack or wall space required for panel installation
 - 2.2.5.2. Coordinate with Electrical Contractor for wire runs from panel location to all ACS devices. Electrical Contractor shall supply, install, and test all cable for ACS, Nurse Call, and AiPhone. System Integration Contractor shall supply wiring diagrams, wiring paths, and wire types for Electrical Contractor.

- 2.2.6. Power Supplies
 - 2.2.6.1. Coordinate with section 08 7100 for all power supplies. DO NOT DUPLICATE power supplies. Verify with section 08 7100 amps required to operate Access Control System devices.
 - 2.2.6.2. Coordinate 110/120 VAC connections required for all power supplies with Division 26.
 - 2.2.6.3. Terminate, test, and commission all ACS devices to power supplies in Section 08 7100. Notify in writing the Architect and Owner Representative if additional power
- 2.2.7.Software License
 - 2.2.7.1. All software license, support agreements and control operational license to be provide for a period of Two (2) years.
 - 2.2.7.2. Disclose all support agreements and cost associated with those agreements listed in G 1 above for years 3, 4, and 5 at the time of bid.
- 2.2.8.Credentials
 - 2.2.8.1. Shall be 13.56 Smart Cards or Key Fobs with aptiQ security keys and mutual authentication keys factory installed
 - 2.2.8.2. Shall be compatible with the card readers for aptiQ wall mounted
 - 2.2.8.3. Shall be compatible with Schlage AD and NDE series integrated access control locks for future growth.
 - 2.2.8.4. Shall be ordered in a 37-bit format or higher with the Facility Code and Sequential numbering provided by an Owner Representative at the time of order.
- 2.3. MATERIALS
 - 2.3.1.Screws and Fasteners: Provide all screws and fasteners of the proper size and type to properly anchor or attach the item of hardware scheduled. Provide all fasteners with Phillips heads, unless security type screws (spanner-head or torx-head) are hereinafter specified.

2.4. HARDWARE PRODUCTS

	-	
2.4.1.1. ITEM	SPECIFIED	APPROVED EQUIVALENT
2.4.1.2. Software	Identicard Maxxess	No Substitution
2.4.1.3. Licenses	Identicard Maxxess	No Substitution
2.4.1.4. Panels	Identicard Maxxess	No Substitution
2.4.1.5. Cards/FOBs Schlage 9520 Mifare		No Substitution
2.4.1.6. Cables		Belden (as spec)
Architectural Approved Equal		
2.4.1.7. Wireless L	ocks Schlage AD/NDE/LE	No Substitution

- 2.5. FINISHES
 - 2.5.1.Hardware finishes as follows:
 - 2.5.1.1. CONFIRM WITH ARCHITECT
- 2.6. CABLE
 - 2.6.1.Cable shall comply with ACS and Door Hardware Manufacturer specified requirements and supplied, installed, and tested by Electrical Contractor

2.6.2.Section 28 1316 is responsible to establish all cable runs, termination, testing, and commissioning for all ACS devices.

3. EXECUTION

- 3.1. EXAMINATION
 - 3.1.1.Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
 - 3.1.2.Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
 - 3.1.3. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 3.1.4.Establish all wiring paths for ACS devices.

3.2. PREPARATION

- 3.2.1.Coordinate with Owner Representative for all IP address, router ports, and other Owner Supplied LAN equipment or ports required for an operational access control system.
- 3.2.2.Coordinate rack space or wall space required for ACS devices.
- 3.2.3. Verify Owner Supplied LAN or VLAN is to ACS manufacturer standards.
- 3.2.4.Verify Owner supplies PC, Laptops, and PDAs are compatible with all ACS devices and software.
- 3.3. INSTALLATION
 - 3.3.1.Installation shall be by a qualified installer with a minimum five (5) years' experience in the installation of commercial grade ACS devices. Manufacturer's instructions shall dictate templating and installation. NOTE: Supplier to provide all necessary mounting brackets, special templates, shoe supports, spacers or other special items required to make door closers and overhead stops to function together. Also if shim kits or drop brackets are required provide them as well for a complete installation. Extras will not be allowed for these items after bid.
 - 3.3.2.Mounting Heights: Mount ACS hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 3.3.2.1. DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 3.3.2.2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3.3.3.Prior to hardware installation, the Contractor shall setup a meeting with the Hardware Supplier, the Door Hardware installer and the ACS supplier to ensure the installer has and understands the manufacturers installation requirements for all hardware items

- 3.3.4.Install each ACS item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 3.3.4.1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 3.3.4.2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- 3.3.5.Boxed Power Supplies: Coordinate with Section 08 7100 and Contractor to locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect prior to installation.
- 3.3.6. Work with all other trades to establish wiring paths for all ACS devices.
- 3.3.7.Work with all other trades to establish the location of each Power Supply. Each power supply shall power (2) o Von Duprin QEL devices and the ACS devices in the same area requiring power. Power cable for devices connecting to the ACS devices shall be supplied and installed by Section 28 13 16
- 3.4. FIELD QUALITY CONTROL
 - 3.4.1.Perform final inspection with hardware installer and hardware supplier present to ensure correct installation and operation, and check for damaged or defective items before installing additional ACS devices. Observe and inspect that all hardware has been installed to its correct destination in proper working order.
 - 3.4.2.Independent ACS Consultant: Owner reserves the right to engage a qualified independent ACS Consultant to perform a separate independent inspection and to prepare an inspection report.
- 3.5. ADJUSTING
 - 3.5.1.Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended.
 - 3.5.1.1. Coordinate door control devices with Contractor to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 3.5.1.2. Have all ACS opening Adjusted immediately before installing ACS devices.
 - 3.5.2.At completion of the installation and prior to Substantial Completion, make final adjustments to all ACS devices. Leave all hardware clean and fully operable. Should an item be found to be defective, it shall be repaired or replaced as directed.
 - 3.5.3.Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's ACS Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors,

door hardware, and electrified door hardware. Coordinate activity with the Installer's Door Hardware Consultant

- 3.6. CLEANING AND PROTECTION
 - 3.6.1.Clean adjacent surfaces soiled by ACS installation.
 - 3.6.2. Clean operating items as necessary to restore proper function and finish.
 - 3.6.3.Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.
- 3.7. DEMONSTRATION
 - 3.7.1. Instruct Owner's Personnel in proper adjustment ACS devices at final installation.
 - 3.7.2. After ACS is installed and adjusted, the Supplier shall inspect the job with the Architect and the General contractor to determine if the hardware is functioning properly

3.8. HARDWARE SCHEDULE

- 3.8.1.Install, terminate, test, and commission all devices listed in section 3.8 and listed below. Coordinate Operational Description with Section 08 7100 supplier and Owner Representative. Section 08 7100 Hardware Groups are listed below to prevent DUPLICATION of access control devices. Use operational description as a guide and verify in writing a description requiring changes for turn-key ACS operation.
- 3.8.2. The hardware sets listed below represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.

END OF SECTION











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ASK-1.4

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