



POUDRE SCHOOL DISTRICT R-1

INVITATION FOR BID

DISTRICT-WIDE INTERCOM WIRING SERVICES

IFB 21-680-001

BID SCHEDULE

IFB Posted to BidNet

July 10, 2020

Mandatory Site Visits

July 28, 2020 – 8 a.m. MST

Questions Due

July 30, 2020 – 2 p.m. MST

IFB Closing Date

August 4, 2020 – 2 p.m. MST

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**INVITATION FOR BID
DISTRICT-WIDE INTERCOM WIRING SERVICES
IFB 21-680-001**

Poudre School District (the District) is requesting bids for materials and installation of CommScope Category 6a Ethernet cabling as specified in this Invitation for Bid (IFB).

A copy of the bid and any associated addenda may be obtained from the Rocky Mountain E-Purchasing (BidNet) website: <http://www.RockyMountainBidSystem.com>.

All contractors planning to submit bids for this IFB are required to be represented at five (5) school site visits on **July 28, 2020**. The site visits will begin promptly at **8 a.m.** MST at the front entrance of Cache La Poudre Elementary School (3511 West County Road 54G, Laporte, 80535), then move to Cache La Poudre Middle School, then Dunn Elementary, then Kruse Elementary, and finally Fort Collins High School.

The site visits will follow current local recommendations regarding social distancing and COVID-19 considerations. In order to attend the site visits, contractors must RSVP by emailing Karen Wailly (kwailly@psdschools.org) no later than **2 p.m.** on **July 24, 2020** providing the names, email addresses, phone numbers, and the titles of the attendees. To regulate group sizes, contractor attendees should be limited to only the staff necessary to bid the project. Depending on the number of attendees, site visits may proceed in one or more groups. Individuals not registered to attend the site visits will not be permitted.

All individuals involved in the site visits are required to wear proper face coverings. We ask that you please do not attend if you are experiencing any of the following symptoms:

- Coughing
- Shortness of breath or difficulty breathing
- Fever of 100.4 or higher
- Chills
- Sore throat
- Muscle aches
- Recent loss of taste and/or smell

Additionally, if any contractor planning to attend the site visits has been exposed to someone that has tested positive for COVID-19 in the past 14 days, please do not attend.

Contractors must plan accordingly to allow adequate time on July 28th for the site visits. Bids received from contractors who did not attend *all* the site visits will not be considered. A sign-in sheet will be used.

Questions regarding this IFB must be in writing and directed to the District through the BidNet platform any time after the issuance of the IFB through and including 2:00 p.m. MST on **July 30, 2020**. Questions received after the deadline time/date and/or not submitted electronically through the BidNet platform may not be addressed. Each question submitted, as well as the District's response thereto, shall be provided in an addendum through BidNet.

Note: Every question must be submitted individually. Multiple questions per entry will not be answered.

The District will only accept and consider electronically submitted bids. Bids must be submitted and received in BidNet's electronic solicitation portal by 2:00 p.m. MST on **August 4, 2020**. At that time, the submission portal will close, and no further submissions will be allowed, nor considered.

At no time during the solicitation process will communication regarding this IFB be permitted with any District employee other than the Procurement Agent named below until an award has been announced. Communication with a district employee other than the Procurement Agent named below may disqualify your bid from consideration.

District staff shall review the bids received in response to this IFB during the bid consideration period commencing on August 4, 2020. During the bid consideration period, the District may ask questions of and/or request additional information from contractors who have submitted bids.

Sales Prohibited/Conflict of Interest: No officer, employee, or member of the School Board, shall have a financial interest in the sale to the school district of any real or personal property, equipment, material, supplies or services where such officer or employee exercises directly or indirectly any decision-making authority concerning such sale or any supervisory authority over the services to be rendered. This rule also applies to subcontracts with the District. Soliciting or accepting any gift, gratuity favor, entertainment, kickback, or any items of monetary value from any person who has or is seeking to do business with the District is prohibited.

Collusive or sham bids: Any bid deemed to be collusive or a sham bid will be rejected and reported to authorities as such. Your authorized signature on the bid assures that such bid is genuine and is not a collusive or sham bid.

The District reserves the right to reject any and all bids and to waive any irregularities or informalities.

Sincerely,
Karen Wailly
Senior Procurement Agent

1.0 **BACKGROUND**

The District is a high-performing District, covering more than 1,800 square miles in northern Colorado with diverse school settings. The District's instructional program is centered around District Ends, under the Policy Governance model, developed to support a comprehensive curriculum.

While more than 70% of the District's families choose to send their children to their neighborhood school, the District does support school choice and offers a wide spectrum of educational programs to fit any child's needs. Program options include International Baccalaureate, Core Knowledge, Bilingual/Dual Language Immersion, Hybrid/Online, Expeditionary Learning, Science, Technology, Engineering and Math (STEM) along with extra-curriculars and athletics. The District has two LEED certified school buildings and over 30 Energy Star awards and supports operational sustainability in all areas of work.

Our Schools:

- 31 elementary schools
- 10 middle schools
- 4 comprehensive high schools
- 6 option (100% choice) schools
- 3 alternative high schools
- 4 charter schools
- 1 online school

The District is fully accredited by the Colorado Department of Education Accreditation and Accountability Unit and is subject to periodic monitoring to ensure continued compliance with accreditation standards.

2.0 GENERAL TERMS AND CONDITIONS

- 2.1 This is a solicitation for an offer and is not an offer to contract for goods or services.
- 2.2 These General Terms and Conditions apply to all offers made to the District by all prospective contractors (Contractors) on behalf of District solicitations including, but not limited to, Invitations for Bid (IFB), Requests for Documented Quotes (DQ), Requests for Qualifications (RFQ) and Requests for Proposals (RFP).
- 2.3 Submission of a bid is deemed as acceptance of all terms, conditions and specifications contained in the solicitation package provided to the Contractor. Any proposed modification must be accepted in writing by the District prior to award of the agreement.
- 2.4 Contractor must provide all requested information. Failure to do so may result in rejection of the bid at the option of the District.
- 2.5 The District is exempt from City, County, State and Federal Sales/Excise Taxes. Tax Exempt Certificates will be issued upon request. The District's Tax-Exempt Number is: 98-03335.
- 2.6 There is no expressed or implied obligation for the District to reimburse Contractors for any expenses incurred in preparing bids in response to this solicitation.
- 2.7 Bids must meet or exceed specifications contained in the solicitation document.
- 2.8 All chemicals, equipment and materials proposed and/or used by Contractor in satisfaction of the terms of this solicitation shall conform to the standards required by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA). Safety Data Sheets (SDS) shall accompany each shipment, when applicable.
- 2.9 Each Contractor (and its employees, representatives, and subcontractors) agrees to abide by all applicable Federal, State and Local codes, laws, rules, and regulations. The awarded Contractor shall also furnish all supplies, which conform to all applicable safety codes and regulations.
- 2.10 The Contractor, by affixing his signature to this bid, certifies that his bid is made without previous understanding, agreement, or connection either with any persons, firms or corporations offering a bid for the same items or with the District. The Contractor also certifies that his bid is in all respects fair, without outside control, collusion, fraud, or otherwise illegal action.
- 2.11 The successful Contractor will be required to enter into a negotiated agreement with the District prior to the start of project work.
 - 2.11.1 The agreement language will control over any language contained within this

IFB that conflicts with the signed and fully executed agreement.

- 2.12 The initial agreement between the District and the awarded Contractor is planned to commence upon full execution of the agreement and shall continue through and including June 30, 2021, unless terminated earlier by the District as in section 2.13 and 2.14 below.
- 2.12.1 For services provided, and at the option of the District, the agreement may be extended beyond the first term for up to three (3) additional one-year terms, beginning on July 1 of each subsequent year and is subject to the parties' negotiation of mutually agreeable one-year fee schedule for each successive one-year term.
- 2.13 Notwithstanding the planned term of an agreement and/or any extensions thereof as provided in sections 2.12 and 2.12.1 above, the District may terminate the agreement at any time in its sole discretion for any reason, with or without cause, upon written notice served on the Contractor no less than thirty (30) days prior to the date of termination. In the event of such early termination by the District, the Contractor shall be paid up to the date of termination for services performed under and in accordance with this agreement.
- 2.14 Notwithstanding any other term or provision of this IFB, the District's obligations hereunder are expressly subject to its budgeting and appropriation of sufficient funds for each fiscal year (July 1 - June 30) an agreement is in effect. In no event, shall the District's obligations in an agreement constitute a multiple-fiscal year direct or indirect debt or other financial obligation under Article X, Section 20(4)(b) of the Colorado Constitution.
- 2.15 In the event the District has reasonable grounds to believe that any individual assigned to perform work under this agreement has a criminal record, is a registered sex offender, is under the influence of alcohol or other substance, has exhibited violence or based upon other information the District deems reliable; the District may exclude such individual from any school building or grounds or impose reasonable conditions upon such individual's presence upon any school premises. In the judgment of the District, if the agreement cannot be performed as a result of such action, the agreement may be terminated.
- 2.16 Contractor shall provide any and all services as an independent Contractor of the District, and the persons performing such services shall not be considered employees of the District. Contractor shall be exclusively responsible for: (a) all compensation, employment tax withholdings and payments, and all fringe benefits for its employees in full compliance with all applicable federal, state and local laws; (b) all insurance coverage's and benefits for its employees in full compliance with all applicable federal, state and local laws, including but not limited to pension or retirement benefits, works' compensation, unemployment compensation, and Social Security benefits; and (c) all payments to its Contractors and subcontractors for goods and/or services directly or indirectly related to the solicitation.

- 2.17 Contractor certifies, represents, warrants and agrees that it will not knowingly employ or contract with an illegal alien to provide services under this agreement, and will not enter into an agreement with a subcontractor that fails to certify to Contractor that the subcontractor will not knowingly employ or contract with an illegal alien to provide services under this agreement. Contractor also certifies, represents, warrants and agrees that it will confirm the employment eligibility of all its employees who are newly hired for employment to provide services under this agreement through Contractor's participation in either: (a) the E-Verify Program created under federal law and jointly administered by the Department of Homeland Security and the Social Security Administration; or (b) the Colorado Department of Labor and Employment Program ("Department Program") established pursuant to C.R.S. § 8-17.5-102(5)(c).
- 2.17.1 Contractor shall not use either the E-Verify Program or the Department Program procedures to undertake pre-employment screening of job applicants while this agreement is being performed. If Contractor obtains actual knowledge that a subcontractor providing services under this agreement knowingly employs or contracts with an illegal alien, Contractor shall notify the subcontractor and the District within three (3) days that Contractor has such actual knowledge and terminate the subcontract within three (3) days of providing the notice if the subcontractor has not stopped employing or contracting with the illegal alien. Contractor shall comply with any reasonable request made by the Department of Labor and Employment in the course of an investigation undertaken pursuant to the authority of C.R.S. § 8-17.5-102(5). If Contractor participates in the Department Program, it shall: (a) notify the District and the Department of Labor and Employment of such participation as required by law; and (b) within twenty (20) days after hiring an employee to provide services under this agreement, provide to the District a written notarized copy of an affirmation that it has examined the legal work status of such employee, retained file copies of the documents required by 8 U.S.C. § 1324a, and not altered or falsified the identification documents for such employee.
- 2.18 Contractor agrees to provide the items covered in this solicitation in strict accordance with the District's specifications and at the price noted for each item.
- 2.19 Unless otherwise agreed in writing by the District, delivery of products shall be FOB destination with all transportation and handling charges paid by the awarded Contractor. The District's acceptance of any offer is made in reliance on Contractor's promised delivery date and/or installation of service performance time, as material and basic to the acceptance. If Contractor fails to deliver as and when promised, the District may, without liability and in addition to its other rights and remedies at law or in equity, cancel the order by notice effective when received by Contractor as to goods not yet delivered and services not yet rendered, and purchase substitute goods or service elsewhere and charge Contractor with any loss incurred.

- 2.20 Contractor shall not assign an agreement, as a result of this solicitation, or any of its rights, interests, or obligations without the prior written consent of the District. The consent may be withheld for any reason or no reason as determined by the District in its sole discretion.
- 2.21 Contractor agrees to not refuse to hire, discharge, promote, demote, or to otherwise discriminate in matters of compensation against any person otherwise qualified solely because of race, creed, sex, national origin, ancestry, or physical handicap.
- 2.22 Venue for any and all legal action regarding or arising out of transactions covered herein shall be solely in the District Court in and for Larimer County, State of Colorado. The transactions covered herein shall be governed by the laws of the State of Colorado.
- 2.23 Bids shall contain a signature of an authorized representative in the space provided on the Bid Certification Form. Failure to properly sign bid may result in bid being considered non-responsive.
- 2.24 Where there appears to be variances or conflicts between the General Terms and Conditions and the special conditions outlined in this solicitation, the special conditions shall prevail.
- 2.25 The District shall issue written addenda if substantial changes, which impact the technical submission of bids, are required. Copies of such addenda will be distributed via the BidNet system. In the event of conflict with the original agreement documents, addenda shall govern all other agreement documents to the extent specified. Subsequent addenda shall govern over prior addenda only to the extent specified.
- 2.26 All information and supplemental documentation required in conjunction with this bid shall be furnished by the Contractor with its bid. If the Contractor fails to supply any required information or documents, its bid may be considered non-responsive and ineligible for award.
- 2.27 The accuracy of the bid is the sole responsibility of the Contractor. No changes in the bid shall be allowed after the submission deadline, except when the Contractor can show clear and convincing evidence that an unintentional factual mistake was made, including the nature of the mistake and the price actually intended.
- 2.28 The apparent silence or omissions within this solicitation regarding a detailed description of the materials and services to be provided shall be interpreted to mean that only the best commercial practices are to prevail and that only materials and workmanship of first quality are to be used.
- 2.29 Contractors may offer a cash discount for prompt payment; however, such discounts shall not be considered in determining the lowest net cost for bid evaluation purposes.

- 2.30 A purchase order resulting from this solicitation shall be governed by and construed in accordance with the laws of the State of Colorado.
- 2.31 Payment for the goods and/or services furnished by the Contractor shall not constitute acceptance thereof. The District shall have the right to inspect such goods and the products of such services, and to reject any or all of which are in the District's judgment defective or nonconforming. In addition to the District's other rights, goods rejected, and goods supplied in excess of quantities specified in a purchase order, may be returned to the Contractor at the Contractor's expense. The District may charge Contractor all expenses of unpacking, examining, repacking, and reshipping such goods. In the event the District receives goods whose defects or nonconformity is not apparent upon examination, the District may require replacement and/or payment of damages upon discovery of the defects or nonconformity. Nothing contained herein shall relieve, in any way, Contractor from the obligation of testing, inspection, and quality control.
- 2.32 The District may, at its sole and absolute discretion:
- 2.32.1 Reject any and all or parts of any or all bids submitted by prospective Contractors;
 - 2.32.2 Re-advertise this solicitation;
 - 2.32.3 Postpone or cancel the bid process for this solicitation;
 - 2.32.4 Waive any irregularities or technicalities that are not qualified as a requirement for responsiveness in this bid or in bids received in conjunction with this bid; and/or
 - 2.32.5 Determine the criteria and process whereby bids are evaluated and awarded.
- 2.33 Information and materials submitted in response to this IFB may be considered public records subject to disclosure under the Colorado Open Records Act ("CORA"), C.R.S. §§ 24-72-200.1 to -205.5. Information and materials that Contractor believes are confidential and not subject to disclosure under CORA must be submitted separately with a citation to the section of CORA and any other relevant law under which Contractor believes they are confidential. The District, not Contractor, shall determine whether information and materials so identified will be withheld as confidential, but will inform Contractor in advance of disclosure to give it an opportunity to take legal action to protect its interests vis-à-vis the party making the CORA request.
- 2.34 For the purposes of solicitation evaluation, Contractor must indicate any variances to the specifications and terms and conditions, no matter how slight. If variations are not stated in the Contractor's response, it shall be construed that the quote fully complies with the specifications and terms and conditions. Notwithstanding the above, it is hereby agreed and understood that the District reserves the right to

reject these variations if they individually, or as a whole, do not meet the standards established in the specifications.

2.35 Appeal of Award. Contractor may appeal the award by submitting, in writing, a request for re-consideration to the District’s Strategic Sourcing department within seventy-two (72) hours after the receipt of the notice of award.

2.36 Cooperative Purchasing Efforts

Poudre School District is a member of, or affiliated with, several regional professional procurement organizations within Colorado and Wyoming. These organizations are comprised of governmental purchasing agents, or agency representatives responsible for the purchasing function. These organizations include:

2.36.1 Colorado Educational Purchasing Council (CEPC) - A cooperative purchasing organization comprised of purchasing agents/buyers representing all Colorado public school districts.

2.36.2 Multiple Assembly of Procurement Officials (MAPO) - A cooperative purchasing organization comprised of procurement representatives from state, county, municipal, governments, special districts, or school districts along the front range of the Rocky Mountains in Colorado.

2.36.3 Rocky Mountain Governmental Purchasing Association (RMGPA) - A chapter member of the National Institute of Governmental Purchasing (NIGP), consisting of public procurement professionals and their representative agencies which include approximately 100 state, county, and municipal governments; school districts and higher education; and other special districts.

2.36.4 Members of these organizations, at their discretion, may request use of the agreements or awards that result from this solicitation. Each governmental entity which uses an agreement(s) resulting from this solicitation would establish its own agreement, issue its own orders, schedule deliveries, be invoiced individually, make its own payments, and issue its own exemption certificates as required by the Contractor. It is understood and agreed that the District is not a legally binding party to any contractual agreement made between another governmental entity and the Contractor as a result of this solicitation. The District shall not be liable for any costs or damages incurred by any other entity. Usage by any other entity shall have no negative impact on the District in the current term or in any future terms.

3.0 CONTRACTOR’S RESPONSIBILITIES

3.1 The Contractor shall furnish all labor, materials, and equipment, necessary for satisfactory agreement performance.

- 3.2 Upon request, proof will be available that the Contractor possesses adequate and sufficient equipment and resources to perform quality service and to commence work once the agreement has been fully executed.
- 3.3 Contractor shall be responsible for all site cleanups, to include trash removal. District dumpsters are not to be used. The buildings and property of the District shall be left in an acceptable as found condition. All unusable materials and debris shall be removed from the District premises. At completion, the Contractor shall thoroughly clean up all areas where work has been involved as mutually agreed with the District's project manager.
- 3.4 The Contractor shall be responsible for disposing environmentally hazardous waste materials in a manner that is consistent with regulations stipulated by the United States Environmental Protection Agency (EPA) as well as with any state or locally prescribed procedures.
- 3.5 Contractor shall be solely responsible for the safety of its work, materials, equipment, tools, etc. on the site and shall, if deemed necessary or expedient, employ, at its own expense, the services of a competent watchman. The District disclaims all responsibility for the safety of the work, materials, equipment tools, etc. or for any damage, which may be done to same due to theft, or any other cause until such time as the District formally accepts the completed work.
- 3.6 Contractor shall be responsible for all necessary permits and inspections.
- 3.7 Contractor agrees that it is fully responsible to the District for the acts or omissions of its subcontractors or of persons employed by them, in the same way as it is for the acts and omissions of persons directly employed by the Contractor. Nothing contained in the agreement or any subcontract shall create a contractual relation between any subcontractor and the District.
- 3.8 Project estimates, schedules, work activity, other trades not included in the agreement, inspections, and payment requests must be approved by the District's project manager.
- 3.9 Upon execution of agreement, Contractor shall adhere to the specified start and completion timeline. Failure to complete project within the stated dates could result in termination of the agreement by the District.
- 3.10 Contractor shall visit the project site prior to commencement of work to verify working area project scope and safety issues.
- 3.11 Contractor shall furnish all required personal safety equipment.
- 3.12 Contractor shall promptly repair, replace or otherwise correct any of its workmanship and any parts, materials, components, equipment or other items in the work which contain faults or defects, whether such failures are observed by the District or

Contractor before or after completion. The Contractor shall bear all costs of correcting such work covered by the warranties.

- 3.13 Contractor, at its own expense, shall repair or replace any damages to any equipment, facilities or other personal or real property owned or leased by the District which is damaged as a result of any such fault or defect, at no cost to the District.
- 3.14 Contractor will be responsible for providing a clean and safe environment surrounding the work area at all times, including, if necessary, fencing of equipment, storage, and work area. The buildings and property of the District shall be left in an acceptable as found condition.

4.0 WARRANTIES

- 4.1 The Contractor warrants that all parts, material, components, equipment and other items used to perform the work shall be new and suitable for the purpose used and will be of good quality, free from faults and defects and all work will be free of defects and in conformance with the agreement documents. The Contractor also warrants that its workers will be sufficiently skilled to produce the highest quality of work, which is free from faults and defects. Work not so conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor further warrants that the construction processes and methods employed to perform the work shall be suitable for the results required.
- 4.2 The Contractor shall promptly repair, replace, or otherwise correct any of its workmanship and any parts, materials, components, equipment or other items in the work which contain faults or defects, whether such failures are observed by the District, consultant, or Contractor before or after final completion. The Contractor shall bear all costs of correcting such work covered by the warranties.
- 4.3 The Contractor shall further warrant that all work shall be free of defects of material and workmanship for a period of one (1) year minimum and/or as required in the bid documents. The Contractor agrees it will, at its own expense, repair and replace all such defective work and all other work damaged thereby which become defective during the term of the guarantee warranty. Whenever guarantees or warranties are required by the specifications for a longer period than the one (1) year warranty, such period shall govern. The District shall have the full benefit of longer warranties provided by the Contractor/manufacturer.
- 4.4 Upon discovery of any warranty defect, the District shall give written notice to the Contractor and state the time frame in which the repairs shall be made.
- 4.5 The Contractor, at its own expense, shall repair or replace any damages to equipment, facilities, or other personal or real property owned by the District which is damaged as a result of any such fault or defect, at no cost to the District.

5.0 PROJECT SCOPE AND SPECIFICATIONS

- 5.1 To support a district-wide intercom system replacement project, the District is seeking bids from qualified Contractors to provide and install CommScope Category 6a Ethernet cabling punched down at District designated patch panel locations. The cabling shall be installed and properly terminated to wall jacks by the Contractor in classroom locations determined by the District and intercom system design plans.
- 5.2 The Project consists of 50 school sites and may include some administrative buildings.
 - 5.2.1 The Project will be completed in phases spanning approximately three years. The initial phase (Phase 1) consists of five (5) pilot schools: Cache La Poudre Elementary, Cache La Poudre Middle School, Dunn Elementary, Kruse Elementary, and Fort Collins High School.
- 5.3 It is the intention of the District to award the entire Project to a single Contractor based on submissions for the Phase 1 in this IFB.
 - 5.3.1 The pricing provided by the awarded contractor shall be used as an estimate for the remaining school sites.
- 5.4 The District Technical Specifications outlining the requirements for the cable and patch panel installations are included as Exhibit A.
 - 5.4.1 For purposes of this IFB, Contractor shall reference the sections of Exhibit A that pertain to Cat. 6a.
- 5.5 Work may begin immediately following the execution of the agreement.
 - 5.5.1 Off hour and weekend work may be required while school is in session, and dependent on the mode of operation in response to COVID-19.
- 5.6 Connecting the newly installed wiring to the District's network infrastructure (patching) will be completed by the District.
- 5.7 Contractors must be CommScope Certified Installers.

6.0 COST PROPOSAL AND REQUIREMENTS

- 6.1 For evaluation purposes of this IFB, provide line item pricing for each charge below based on the five (5) Pilot schools designated in Phase 1.
- 6.1.1 CommScope Cat. 6a Ethernet cables with booted ends, black. The District will do the patching connections but may opt to procure cables through awarded Contractor.
- Length: 3 foot
 - Length: 5 foot
 - Length: 7 foot
- 6.1.1.1 Two (2) Cat. 6a drops are required in each classroom. Contractor shall run these from nearest or most logical telecom closet (MDF/IDF) as approved by the District.
- a. Cache La Poudre Elementary – 28 classrooms
 - b. Cache La Poudre Middle School – 33 classrooms
 - c. Dunn Elementary – 24 classrooms
 - d. Kruse Elementary – 32 classrooms
 - e. Fort Collins High School – 84 classrooms
- 6.1.1.2 Cable lengths and quantities will vary.
- 6.1.2 CommScope Patch panels - One per Communication Room
- 6.1.2.1 The District will specify the location for the panels.
- 6.1.2.2 The District reserves the right to secure and install the patch panels if it proves to be in its best interest.
- 6.2 Provide line item pricing for each additional item deemed necessary for the Project.
- 6.3 Provide a sub-total price for each of the five (5) Pilot schools.
- 6.4 Provide a grand total price for the five (5) Pilot schools.
- 6.5 Provide warranty information.
- 6.6 Provide line item estimated timelines for the five (5) Pilot schools in Phase 1.
- 6.7 Provide a complete Project timeline that includes the remaining 45 school sites
- 6.8 Provide a copy of your company's CommScope Certification.

- 6.8.1 At all times during the Project, there must be at least one person on site who is CommScope certified.
- 6.9 Indicate the number of years your company has been in business.
- 6.10 Indicate the number of employees in your company.
- 6.11 Indicate the total number of installers your company has available to complete the District Project.

7.0 EVALUATIONS AND AWARD OF AGREEMENT

- 7.1 The District intends to select a single Contractor with whom to contract for wiring services.
- 7.2 Award shall be made to the responsive and responsible Contractor meeting the specifications and deemed to be in the best interest of the District. Final evaluation may be based on, but not limited to proof of certification, price, delivery time, customer references, and previous experience with similar projects.
 - 7.2.1 Those bids that are clearly non-responsive to the stated requirements may be eliminated prior to evaluation.
- 7.3 A submission of a bid in response to this IFB is an offer to contract with the District based upon the terms, conditions, scope of work and specifications contained in this IFB.
- 7.4 All changes in bid documents shall be through written addenda and shall be posted to BidNet.
 - 7.4.1 Amendments or clarifications to the submitted bids not requested by the District will not be accepted, nor considered in awarding the agreement.

8.0 INSURANCE

Contractor shall procure and maintain the required insurance specified below for the duration of this Agreement, which insurance shall be written for not less than the amounts specified or greater if required by law. Specified coverages and amounts may be provided by a combination of a primary policy plus an umbrella or following form excess policy. If not otherwise required by law, lower amounts may be acceptable upon review and written approval by the District's Director of Records and Risk Management. All insurance shall be with a carrier licensed in the state of Colorado and shall have a minimum A.M. Best rating of A- VII. Contractor shall furnish the District's Director of Records and Risk Management with certificates of the required insurance prior to the District's approval and signing of this Agreement, and with renewal certificates prior to the expiration of any required insurance that expires during the term of this Agreement. Certificates of Insurance and all communication regarding insurance shall be sent to:

Poudre School District
Attention: Risk Management
Email: risk@psdschools.org (preferred method of communication)
2407 Laporte Ave
Ft. Collins, CO 80521

Any insurance and/or self-insurance carried by the District is excess of the coverage extended to the District by Contractor. Contractor shall provide at least thirty (30) days' advance written notice to the District prior to cancellation, change of coverage, or non-renewal. The insurance requirements specified in this section shall not reduce the indemnification liability that Contractor has assumed in section 8.1.

Commercial General Liability

Coverage to include:

- a. Premises and Operations
- b. Explosions, Collapse and Underground Hazard
- c. Personal / Advertising Injury
- d. Products / Completed Operations
- e. Liability assumed under an Insured Contract (including defense costs assumed under Contract)
- f. Designated Construction Project(s) General Aggregate Limit, ISO CG 2503 or equivalent
- g. Automatic Additional Insurance Endorsement, Owners, Lessees, or Contractors Endorsement, ISO CG 2038 or equivalent
- h. Poudre School District R-1, its elected officials, employees, agents, and volunteers shall be named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Contractor, including Completed Operations, Lessees or Contractors Endorsement, ISO CG 2307 or equivalent and shall be insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Agreement.

Completed Operations coverage must be kept in effect for up to the statue of repose after Project completion.

Minimum Limits

a. Each Occurrence Limit	\$2,000,000
b. General Aggregate	\$3,000,000
c. Products/Completed Operations Aggregate	\$3,000,000
d. Personal/Advertising Injury	\$2,000,000
e. Fire Damage (Any One Fire)	\$50,000
f. Medical Payments (Any One Person)	\$5,000

For estimated Projection Construction Cost from \$10,000,000 - \$29,999,999:

a. Each Occurrence	\$5,000,000
b. General Aggregate	\$5,000,000
c. Products/Completed Operations Aggregate	\$5,000,000
d. Personal/Advertising Injury	\$5,000,000
e. Fire Damage (Any One Fire)	\$50,000
f. Medical Payments (Any One Person)	\$5,000

For estimated Projection Construction Cost from \$30,000,000 - \$49,999,999:

a. Each Occurrence	\$10,000,000
b. General Aggregate	\$10,000,000
c. Products/Completed Operations Aggregate	\$10,000,000
d. Personal/Advertising Injury	\$10,000,000
e. Fire Damage (Any One Fire)	\$50,000
f. Medical Payments (Any One Person)	\$5,000

For estimated Projection Construction Cost from \$50,000,000 - \$99,999,999:

a. Each Occurrence	\$25,000,000
b. Annual Aggregate	\$25,000,000
c. Products/Completed Operations Aggregate	\$25,000,000
d. Personal/Advertising Injury	\$25,000,000
e. Fire Damage (Any One Fire)	\$50,000
f. Medical Payments (Any One Person)	\$5,000

For estimated Projection Construction Cost over \$100,000,000 - Contact Risk Management for limits and type of insurance.

Professional Liability

Minimum Limits

a. Each Occurrence or Wrongful Act Limit	\$1,000,000
b. Annual Aggregate Limit	\$3,000,000
c. In the event that the Professional Liability insurance required by this Agreement is written on a claims-made basis Contractor warrants that any retroactive date under the policy shall precede the effective date of this Agreement and that either	

continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning at the time work under this Agreement is completed.

- d. Contractor must provide evidence of the extended reporting period coverage at the end of the Project and before all final payments to the Contractor is made.

Contractor's Pollution Liability, Including Errors and Omissions (If work involves potential pollution risk or losses caused by pollution conditions, including asbestos).

For losses caused by pollution conditions including coverage for bodily injury, property damage, (including natural resource damage), cleanup costs, removal, storage, disposal, and or use of the pollutant; and defense costs, including costs and expenses incurred in the investigation, defense, or settlement of claims. Coverage shall apply to the sudden and gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). and cleanup costs that arise from the operations of the Contractor as described in the Scope of Services section of this Agreement.

Minimum Limits

- a. Per Loss \$5,000,000
- b. Products/Completed Operations Aggregate \$5,000,000
- c. The policy shall provide for complete professional service coverage, including coverage for pollution liability that is the result of a breach of professional duties.
- d. The policy shall provide for protection against claims for third-party bodily injury, property damage, or environmental damage caused by pollution conditions resulting from the Contractor's contracting activities for which the Contractor is legally liable.
- e. The policy shall provide for cleanup costs when mandated by governmental entities, when required by law, or as a result of third-party claims.
- f. The policy shall be endorsed to include the following additional insured language: "Poudre School District R-1, its elected officials, employees, agents, and volunteers shall be named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Contractor" and shall be insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Agreement. Copy of policy endorsement must be attached to the Certificate of Insurance.
- g. Contractor warrants that any retroactive date under the policy shall precede the effective date of this Agreement; and that either continuous coverage will be maintained, or an extended discovery period will be exercised for a period of three (3) years beginning at the time work under this Agreement is completed.
- h. Completed Operations Coverage shall be kept in place for up to the statute of repose.

Builders' Risk

The policy shall:

- a. Be written on an "All Risk" basis (Special Coverage Form) including flood and earthquake.

- b. Provide coverage of property at the construction site, off-site storage locations and in transit.
- c. Be written on a completed value; the estimated completed value of the Project is used as the limit of insurance.
- d. Poudre School District R-1, its elected officials, employees, agents, and volunteers, the Contractor, and subcontractors, shall be named insureds under the policy.

Soft Costs (or delay in opening) coverage is necessary on very large projects. Specific coverage requirements will be determined based on the possible exposure. Contact Risk Management for additional specific insurance requirements.

- Coverage for agreements less than \$1 million is provided by Colorado School Districts Self Insurance Pool and requires a completed application.
- Agreements that exceed \$1 million may require additional builders’ risk insurance coverage.

Commercial Automobile Liability Providing Coverage for Owned, Non-Owned, and Leased or Hired Vehicles (Only required if Contractor operates vehicles in performing any services under this Agreement)

Bodily Injury & Property Damage Combined Single Limit Minimum	\$1,000,000
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If work involves the transportation of hazardous materials or regulated substances:

- a. Bodily Injury/Property Damage (Each Accident) Minimum Limit \$5,000,000
- b. The Policy shall include a CA 9948 Endorsement (or its equivalent) and MCS-90 to provide coverage for claims resulting in bodily injury, property damage or cleanup costs associated with a pollution condition from transported cargo.
- c. The policy shall be endorsed to include the following additional insured language: “Poudre School District R-1, its elected officials, employees, agents, and volunteers shall be named as an additional insured to the policy, with respect to liability arising out of the activities performed by, or on behalf of the Contractor and shall be insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Agreement.

Workers’ Compensation and Employers’ Liability*

Minimum Limits

- a. State of Colorado Statutory
- b. Employer’s Liability \$500,000 Each Accident
\$500,000 Disease – Policy Limit
\$500,000 Disease – Each Employee
- c. Waiver of subrogation in favor of Poudre School District R-1.

*This requirement shall not apply if Contractor is exempt under the Colorado Workers’ Compensation Act AND if Contractor has a current Workers’ Compensation Coverage Rejection on file with the Colorado Department of Labor and Employment, Division of Worker’s Compensation.

- 8.1 Contractor shall indemnify and hold harmless the District and the District's Board members, employees, representatives and agents from and against any and all liability arising from any suit, action, grievance, charge or proceeding brought in connection with or related to Contractor's operations, provision of services and/or conduct of any of its employees, volunteers, agents or representatives. The indemnification and hold harmless obligation hereunder shall include all attorney fees, costs and expenses incurred by the District and/or the District's Board members, employees, representatives and/or agents in defense of said suits, actions, grievances, charges and/or proceedings. Nothing in this section or otherwise in this agreement shall be construed in any way or applied in any manner as a compromise or waiver of the District's rights and protections under the Colorado Constitution or the Colorado Governmental Immunity Act.

9.0 **REFERENCES**

DISTRICT-WIDE INTERCOM WIRING SERVICES
IFB 21-680-001

References are required – List five (5) references for which your company has completed similar services for projects of similar scope.

9.1 Company Name _____
Address _____
Contact Person _____
Phone & Email _____
Describe type of work/service performed _____

9.2 Company Name _____
Address _____
Contact Person _____
Phone & Email _____
Describe type of work/service performed _____

9.3 Company Name _____
Address _____
Contact Person _____
Phone & Email _____
Describe type of work/service performed _____

9.4 Company Name _____
Address _____
Contact Person _____
Phone & Email _____
Describe type of work/service performed _____

9.5 Company Name _____
Address _____
Contact Person _____
Phone & Email _____
Describe type of work/service performed _____

10.0 **BID CERTIFICATION FORM**

**DISTRICT-WIDE INTERCOM WIRING SERVICES
IFB 21-680-001**

Bids must be submitted and received in BidNet’s electronic solicitation portal on or before 2:00 p.m. MST on August 4, 2020.

The undersigned hereby affirms that:

- He/she is a duly authorized agent of the company issuing this bid and that all information provided in the bid is true and accurate.
- He/she has read the conditions and technical specifications, which were made available to the company in conjunction with this IFB, and fully understands and accepts these terms unless specific variations have been expressly listed in the bid.
- The company will adhere to all terms and conditions and provide, at a minimum, all services as expressed in the IFB and/or the company’s bid responding to the IFB.
- The company meets or exceeds all of the required criteria as specified by this IFB, or if not, has submitted a Justification for Consideration addressing any failure to meet the criteria.
- The company’s bid is being offered independently of any other Contractor and in full compliance with the terms specified in this IFB.
- The company will accept any awards made to it, as a result of this IFB for a minimum of ninety (90) calendar days following the date and time of the IFB closing.

Company Name _____

Mailing Address _____

Signature of Agent _____

Printed Name _____

Title _____

e-Mail Address _____

Phone Number _____

Contact Person _____

(If different from Agent – include e-mail address and phone number)

NOTE: Bids submitted without the signature of an authorized agent of the company may be considered non-responsive and ineligible for the award.

DISTRICT-WIDE INTERCOM WIRING SERVICES
IFB 20-680-010
EXHIBIT A

PSD TECHNICAL SPECIFICATION

DIVISION 27
Communications

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SECTION 27 00 00 – GENERAL REQUIREMENTS AND INFORMATION

Part 1: General

1.01 INTENT

- A. The purpose of this document is to outline the necessary specifications for Communications Systems throughout Poudre School District (PSD) facilities, as well as outline the requirements for installation of such systems.
- B. This document may be used as either a basic bid spec to be distributed to a Contractor or Vendor for design/build projects, or as a technical standard for reference by a Technology Consultant for design/bid/build projects.
- C. All specifications within this document shall be viewed as minimum compliance. Specific project conditions may dictate components beyond minimum characteristics specified.
- D. This document contains Communications Systems specs for buildings built prior to 2019, and buildings built in 2019 or later. Infrastructure requirements are different based on the construction date of the building.

1.02 CODES & STANDARDS

- A. Products, Installation and Methods shall comply with the following Codes and Standards:
 - 1. Applicable National Electrical Code (NEC)
 - 2. International Building Code (IBC)
 - 3. Americans with Disabilities Act (ADA)
 - 4. ANSI/TIA/EIA Standards
 - 5. Building Industry Consulting Services International (BICSI)
 - 6. Products must be UL Listed

1.03 COORDINATION

- A. Entity responsible for design of systems shall meet with PSD at various points throughout the design process to ensure systems are being designed in a direction consistent with PSD requirements, standards, and specifications, and to review and resolve issues where non-compliance is necessary.
- B. Communications Systems require careful and detailed coordination with Architectural, Structural, Mechanical, and Electrical systems.
- C. It is the responsibility of the Contractor/Vendor (design/build) or Technology Consultant (design/bid/build) to ensure Communications Systems are properly coordinated.

1.04 CONTRACTOR PREQUALIFICATION

- A. Contractors must be PREQUALIFIED by PSD prior to bid.
- B. Contractors may be prequalified for a specific project or bid by submitting the following to PSD for review:
 - 1. Manufacturer Certifications
 - i. **Buildings constructed in 2018 and earlier have Cat. 5e wiring infrastructure. Contractors for Cat. 5e structured cabling shall be Siemon Certified Installers. They must provide a Siemon end-to-end solution, with certification and application warranty to that end.**
 - ii. **New buildings constructed in 2019 and later will have Cat. 6a infrastructure. Contractors for Cat. 6a structured cabling shall be CommScope Certified Installers.**

They must provide a Commscope end-to-end solution, with certification and application warranty to that end.

2. Industry Certifications
 - i. The Contractor shall have BICSI Level 2 Commercial Installers on staff and involved with this specific project.
3. Similar Project Experience
 - i. The contractor will perform the communications wiring and needs to provide list of references for 5 completed cabling jobs self-performed (not subcontracted). Similar size/scope required. Contractor must be able to demonstrate that they have access to appropriate termination, testing, and installation equipment.
4. Project References
 - i. Name of company the work was performed for.
 - ii. Address of company.
 - iii. Contact person name and position.
 - iv. Brief description of the work performed (including the number of outlets), type of cable system, and testing performed.
 - v. Date of work completed

1.05 WARRANTY

- A. All installed systems and solutions shall be guaranteed to be free from workmanship or manufacturers defects for a minimum period of one year, beginning at building turnover. Provide a written warranty, signed by the Contractor and the manufacturer, agreeing to repair or replace, within warranty period, inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required, during warranty period.
- B. Structured Cabling Solutions shall be guaranteed under applicable "extended warranty".
 1. Products shall be procured from group of manufacturers required to obtain extended warranty for solution.
 2. Contractor shall carry proper certifications and training to offer extended warranty.
 3. Contractor shall perform necessary testing to obtain extended warranty.
 4. Documentation of extended warranty shall be turned over to PSD in Operations & Maintenance manuals.
- C. Responses to warranty problems shall be made within twenty-four hours after notification of such problems by Owner's Representative. The appropriate response shall include a physical visit and investigation of the warranty difficulty.
- D. Prior to leaving the job site, the contractor shall leave a written report of the following to the Owner's Representative:
 1. What was the malfunction?
 2. What repairs / improvements were made to rectify the problem?
 3. What can be done to prevent this from occurring again?
 4. Locations of service call.

1.06 EXISTING SYSTEMS

- A. Additions to existing buildings: The existing Structured Cabling System design, components and installation need to be duplicated to the letter, unless otherwise directed by PSD.
- B. The Contractor will not connect any cables to an existing system; PSD will perform this task.

C. The Contractor will pull, terminate, test and label all cable; install all devices, and run to head end location.

SECTION 27 10 10 – STRUCTURED CABLING SYSTEMS (Locations built 2019 and after)

Part 1: General

1.01 SUMMARY

A. System Description

1. The STRUCTURED CABLING SYSTEM for a school shall consist of any fiber optic cable, twisted pair cable, as well as supporting infrastructure required to establish voice and data facilities throughout the project site.
2. All communications rooms which serve as distribution points for the project site will maintain a consistent temperature of no greater than 80 degrees Fahrenheit, measured at the surface of the powered equipment in the equipment racks.
3. All communications rooms which serve as distribution points for the project site will be electrically connected to the emergency backup generator. All EM power outlets will be installed in close proximity to the data racks for easy access and connectivity.

Part 2: Products

2.01 PRODUCTS

A. General Materials Requirements

1. All materials shall be the most current model or type offered by each manufacturer, shall conform to current applicable industry standards, NEMA standards, approved by the Underwriter's Laboratory.
2. Equipment and materials shall comply with EIA/TIA, IEEE, NEC, NEMA, IPCEA< ANSI, and ASTM standards.
3. Additional Equipment: The contractor shall furnish and install all additional equipment and appurtenances required for a complete, ready for use, installation.

B. Materials Specification – Structured Cabling Systems

1. Fiber Optic Cable & Connectivity:

i. Cables:

- a. Description: Multimode optical fiber, OM3 (50/125-micron), plenum rated non-conductive (OFNP) with aqua jacket.
- b. Strands Per Cable: Middle/High Schools - 12 minimum, Elementary Schools – 6 Minimum.
- c. Maximum Attenuation: -3.5 dB/km at 850 nm; -1.5 dB/km at 1300 nm.
- d. Operating Temperature Range: -20 to 70 deg C.
- e. Manufacturer: None Specified

ii. Cable Connectors: Simplex- and duplex-type SC couplers with self-centering, axial alignment mechanisms. Insertion loss not greater than 0.7dB.

iii. Patch Panels:

- a. A modular panel housing multiple-numbered duplex cable connectors with integral connection plates and pigtail splice tray.
- b. Permanent Connection: One end of each connector module is permanently connected to an installed cable fiber.

- c. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to satisfy specified expansion criteria.
- d. Mounting: Rack mounted.
- e. Manufacturer: CommScope end-to-end product selection and certification.

2. Unshielded Twisted Pair (UTP) Cable & Connectivity:

- i. Backbone Cable:
 - a. Description: 25-pair conductor cable of No. 24 AWG color-coded insulated conductors, plenum rated (CMP), gray jacket.
 - b. Manufacturer: Mohawk, CommScope equivalent.
- ii. Horizontal Cable:
 - a. Description: 4-pair twisted pair conductor cable of No. 24 AWG color-coded insulated conductors, Category 6a compliant, white, plenum rated (CMP).
 - b. Manufacturer: CommScope end-to-end product selection and certification.
- iii. UTP Patch Panels:
 - a. Horizontal Cable: Category 6a, 48 port, RJ45, EIA 568 with 110 type IDC connectors. Modular panel mounting with multiple, numbered jack units. Part # UNP-6A-DM-2U-48 and UNP-6A-DM-1U-24
 - b. Copper Backbone: Category 6a, 48 port, RJ45, EIA 568 with 110 type IDC connectors. Modular panel mounting with multiple, numbered jack units. Part # UNP-6A-DM-1U-24
 - c. Number of Jacks per Field: 1 for each 4-pair cable indicated in the design, plus spares and blank positions adequate to satisfy specified expansion criteria.
 - d. Manufacturer: CommScope end-to-end product selection and certification.
- iv. Workstation Outlets
 - a. Voice/Data Outlet Faceplate:
 - 1. Single Gang modular faceplate, number of ports as required, white color. Manufacturer: CommScope end-to-end product selection and certification. Part # M10L-262(1 Port Face plate) M12L-262 (2 port Face Plate) M14L-262 (4 Port Face Plate) M16L-262(6 Port Face plate) M20AP-262 (Blank insert for Plates)
 - b. Wall Phone Outlet Faceplate and Outlet:
 - 1. Stainless Steel for Keystone Modules.
 - 2. Manufacturer: CommScope end-to-end product selection and certification.
 - c. Voice/Data Outlet Modules:
 - 1. Category 6a modules, white color.
 - 2. Manufacturer: CommScope end-to-end product selection and certification. Part #UNJ10G-WH
 - d. Mounting: Flush, with jacks flush mounted.

C. Materials Specification – Supporting Hardware

- 1. Horizontal Cable Supports:
 - i. Supports similar to Caddy Multi-function Clip No. 4-Z-3-4 and Bridle Ring No. 2-BRT-20.
 - ii. Attach cable supports to new suspension wires, separate from ceiling suspension wires.

2. Telecommunications Terminal Board (TTB):
 - i. ¾-inch AC-grade, fire-resistant-treated plywood mounted the entire length of the wall.
3. Equipment Racks:
 - i. EIA-standard 19" two-post with 12/24 tapped holes (or equivalent).
 - ii. Freestanding modular steel units designed for telecommunications terminal support and coordinated with dimensions of the units to be supported.
 - iii. Equipment rack shall be fastened to floor with anchor bolts.
 - iv. Manufacturer: Chatsworth Products Inc., Part #55053-7031.
 - v. 6" double-sided cable management outside racks, 10" double-sided cable management between racks.
4. Ladder Rack (Cable Runway):
 - i. Provide horizontally mounted ladder rack where cable is to be run horizontally in each telecommunication room.
 - ii. Provide horizontally mounted ladder rack from wall of telecommunication room to each equipment rack.
 - iii. Provide vertically mounted ladder rack where cable is to be run vertically in each telecommunication room.
 - iv. All ladder rack shall be 12" wide nominal, black powder coated. Chatsworth Products Universal Cable Runway. Provide all necessary mounting brackets, supports, and appurtenances.
 - v. Provide radius dropouts to each rack.
5. Outlet and Junction Boxes:
 - i. Outlet boxes shall be sheet metal type, 4-11/16" square x 2-1/2" deep, unless noted otherwise. Provide single-gang device ring.
 - ii. Junction and pull boxes shall be sheet metal type, sized as necessary for quantity of conduits applicable.
 - a. Junction or pull boxes may NOT be used to change pathway direction.
6. Conduit:
 - i. Refer to Electrical Specifications (Division 26).
 - ii. EMT conduits are preferred for above ground installation.
 - iii. Schedule 40 PVC conduits are preferred for underground/buried installation.
 - iv. Provide ENT (Carlon) innerduct for optical fiber through pathways where fiber backbones are to be installed. Innerduct shall be minimum 1".

Part 3: Execution

3.01 Installation

A. INSTALLATION

1. Install structured cabling system in accordance with the following:
 - i. Applicable edition of the National Electrical Code (NEC)
 - ii. National Electrical Contractors Association's "Standard of Installation"
 - iii. ANSI/TIA/EIA standards
 - iv. BICSI recommended practices
2. Label all pull and junction boxes with clearly marked "VOICE/DATA".
3. Install 1-inch conduit, minimum, from each voice/data outlet to nearest above ceiling space.

- i. Conduits shall be appropriate for the purpose, and as otherwise required or permitted in Electrical Raceways.
 - ii. Provide protective bushings on all ends of conduits.
- 4. Install a 200-pound nylon pull cord in each empty raceway.
- 5. All Voice and Data cable from the outlet location to the communication closet shall be in separate bundles and shall be terminated on separate terminal hardware.
- 6. Wiring hardware, D-rings, mushroom spools, and appurtenances shall be provided as needed.
- 7. IDF Closets:
 - i. Data Termination Patch Panels are to be mounted in relay racks located in the Equipment Rooms.
 - ii. "D" Rings are to be installed on the backboards to accommodate proper wire, jumper and patch cord management to the "Voice" punch down blocks and to the "Data Termination Patch Panels".
- 8. Installation above ceilings:
 - i. Where conduit is required, the minimum size shall be 1 inch.
 - ii. Each conduit run shall be from the wall outlet and terminated in the ceiling space.
 - iii. Conduit is required only above non-accessible ceiling.
 - iv. Where conduit is not required, the cable is to be run using cable supports.
 - v. Hangers must be at least 18" above ceiling tiles and light fixtures. Rings must be a maximum of 4' on center.
 - vi. No more than 6 cables may be placed in a single 1 ¼" ring.
 - vii. Rings used may not exceed 1 ¼" diameter when suspended from suspension wires.
 - viii. Larger rings with more cables may be used in areas where space does not permit installation of cable tray.
 - ix. Rings must be run perpendicular to tray and parallel to walls.
 - x. No more than 1 clip may be used on each suspension wire.
 - xi. Ceiling must not be distorted or pulled out of alignment by clip installation.
 - xii. Never under any circumstances use water pipes, sprinkler pipes, electrical conduits, or HVAC ducts as a method of cable supports.
 - xiii. All cables can be installed perpendicular (across) electrical conduits, but never parallel.
 - xiv. Cables installed through firewalls should be "sleeved" with a metallic nipple, adequately cemented in place and filled with an approved fire seal.
 - xv. The bridle rings used are not to exceed 60% fill.
- 9. Conduit: For conduit use where cable makes a 90 degree turn, a junction box is to be installed. Junction boxes shall be minimum 8x8 in size.
- 10. All trash and refuse shall be removed at the completion of each workday.
- 11. Plenum rated cable is to be used in all return air spaces.

B. HORIZONTAL DISTRIBUTION

1. Furnish and install a local area network secondary cable support system and install/terminate/test/label the cable, station jacks and patch panels.
2. Pull cables without exceeding cable manufacturer's recommended pulling tensions. Do not bend cable in handling or installation to smaller radii than minimums recommended by manufacturers.
3. Details on the number and location of voice/data outlets are required on the premises TO BE ON THE DRAWINGS. Note that each outlet location is distinct and may be wired with more than one cable.
4. Cables shall be routed starting at the patch panels and leave the equipment rooms through the ceiling and terminate at the designated station jack. Cables shall be run to each location. Where cables enter the conduit, the cables shall have a gradual curve secured with a cable tie outside the entrance.
5. Cable Ties – Cables shall be bundled and attached to the primary and secondary support system at least every 3 feet. Cable ties shall be plenum rated.
6. Cable Support System – The Contractor shall install a cable support system that will eliminate cable sag and tension. This system shall consist of cable tray, raceways, bridal rings, J-hooks or catenary wire. These cable bundles must be attached to the support system at least every 3 feet.
7. Certification – Certify each cable to meet Category 6a standards in accordance with the wire type installed, and the field test specifications defined in ANSI/TIA-568-C.2 "Commercial balanced twisted-pair telecommunications cabling and components standard."
8. Zone wiring using 25-pair or longer cable runs is not permitted for horizontal wiring. Use of bridges or multiples is not permitted.
9. Examine pathway elements to receive cable. Check raceways and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Do not proceed with installation until unsatisfactory conditions have been corrected.
10. Install exposed cable parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

C. INSTALLATION IN WALLS

1. Install $\frac{3}{4}$ " conduit down wall and connect to box secured to wall studs. Where conduit is installed above ceiling, this shall be an extension of that conduit.

2. If conduit is not installed above ceiling, the conduit in the wall shall extend 8" above ceiling and turn 90 degrees into ceiling space. Install a bushing on conduit end to protect wire.
3. No more than (6) six, 4-pair cables may be placed in 1" conduit.

D. INSTALLATION OF FIRE SEALS

1. When installing sleeves, conduit, or cable through an existing fire barrier and the existing fire barrier is to remain or be patched, the fire and smoke sealant to be installed shall be of the same manufacturer as the existing.
2. After installation of sleeves, wall penetrations, and cores, install sealant to contain smoke and fire up to 2,000 degrees Fahrenheit for 2 hours.
3. Remove damming materials after curing if made of other than fire resistant materials.
4. Protect materials from damage on surfaces subject to traffic.
5. Environmental Requirements;
 - i. Keep flammable materials away from sparks or flame.
 - ii. Provide masking and drop cloths to prevent contamination of adjacent surfaces by fire stopping materials.

E. PULL CORD

1. A pull cord is to be left in all conduit runs and cable supports. (jetline #232) or equivalent.

F. CABLE LABELING

1. Each cable shall be labeled with the corresponding alphanumeric information in the following format: CR-PP-PT, where CR is the Communication Room Number, PP is the patch panel letter, and PT is the patch panel port. The CR number shall be as follows:
 - i. The patch panels shall be lettered starting with "A" at the top of the rack. The port numbers shall correspond to the port number on the patch panel.
2. Labels – each cable shall be labeled on both ends using a vinyl overwrap label. All station jacks (wall bezel) and patch panels shall also be labeled. Labels shall be printed in a 10 point or greater font and shall be applied not less than 3-inches or more than 4-inches from each termination connector. The clear portion of the label shall completely overwrap the label data.

G. TELECOMMUNICATIONS INTERIOR DISTRIBUTION

1. The cross-connect hardware must be designed for flexibility to allow the system to expand up to 50% without the addition of racks, panels, etc.
2. The distribution system design must allow the customer to administer the communication system. Easy station arrangements must be built in.
3. Codes and Standards: The work shall comply with codes and standards applicable to each type of work and as listed these specifications.

4. Equipment: Prior to ordering equipment, verify dimensions and functions of equipment proposed for use. Be certain the equipment is compatible with the structural and architectural features of the work, avoids conflicts with equipment of other crafts, and that it will fit in the space provided.

H. TERMINATION BACKBOARDS (TTBs)

1. Install A-face of backboard plywood facing into room.
2. Finish paint termination backboards with durable enamel prior to installation of wall-mounted equipment.
 - i. Paint backboard area designated for service provider demarcations ORANGE.
 - ii. Paint all other backboard surfaces WHITE.
3. Install termination backboards plumb, and attach securely at each corner.
4. Install #200 nylon pull cord in each empty telephone conduit containing bends or over 10 feet in length.
5. Paint all backboards for demarcation equipment orange.

3.02 GROUNDING & BONDING

A. Grounding and Bonding system shall comply with ANSI J-STD-607.

1. All racks, frames and miscellaneous equipment shall be grounded together using green, No. 6 insulated copper ground wire (low smoke, plenum rated, 6 AWG, 600V, UL listed, 90C) so that all equipment, communications racks and frames are at the same ground potential. A VOM measurement between any two points on racks and equipment cases in the communications room shall be less than 1.25 volts dc or ac potential.
2. The MDF shall have a Telecommunications Main Grounding Busbar (TMGB). All metallic components shall be bonded to this TMGB with compression-style connectors.
3. Each IDF shall have a Telecommunications Grounding Busbar (TGB). All metallic components shall be bonded to this TGB with compression-style connectors.
4. Each TMGB and TGB shall be bonded to building steel.
5. Each TGB shall be bonded to the ground bus in the electrical panel serving power to IDF.
6. The TMGB shall be bonded to the building's main electrical distribution panel ground bus.
7. Separate ground rods are NOT allowed.
8. Bond circuit and service protectors to TMGB.
9. Bond cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common mode returns, noise pickup, cross talk and other impairments. Bond shields and drain conductors to ground at only one point in each circuit.

3.03 SYSTEM INSPECTION AND TESTING

A. Minimum of one (1) week written notice before all testing.

B. Before any testing begins all voice and data station cables for wall and modular furniture installation shall be terminated in the IDF closet.

C. First Testing Inspection:

1. Testing shall be in the presence of the Owner's Representative.
2. Testing shall begin before overhead cover-up, and only wall outlet installations and overhead cabling shall be tested and inspected.

3. A complete log of these testing results shall be submitted before the Second Testing Inspection and use of cable.

D. Second Testing Inspection:

1. Shall be in the presence of the Owner's Representative.
2. Shall begin after all outlet installations are completed.
3. A complete log of these testing results shall be submitted before the use of cable.

E. Any cable deficiency shall be corrected at the time that it has been discovered.

F. A complete log of the test results shall be submitted to Owner's Representative and the Owner's designated Agent.

G. CABLE TESTING

1. Upon installation of cable and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance. Remove temporary connections when tests have been satisfactorily completed.
2. Category 6a cables should be tested for: wire map, length, insertion loss, NEXT loss, PS NEXT loss, ACR-F loss, PS ACR-F loss, return loss, propagation delay, delay skew using a level IIe field tester and certified to meet Category 6a standards in accordance with the wire type installed, and the field test specifications defined in ANSI/TIA-568-C.2 "Commercial balanced twisted-pair telecommunications cabling and components standard." Backbone cables that are not Cat. 6 should at least be tested for signal path continuity and shorts and wire map.
3. Fiber-Optic Cable Procedures: Perform each visual and mechanical inspection and electrical test, including optional procedures, stated in NETA ATS. Certify compliance with test parameters and manufacturer's recommendations.
4. All test results must be submitted to Owner's Representative prior to the Substantial Completion of the project.

SECTION 27 10 20 – STRUCTURED CABLING SYSTEMS (Locations built prior to 2019)

Part 1: General

1.01 SUMMARY

A. System Description

1. The STRUCTURED CABLING SYSTEM for a school shall consist of the fiber optic cable, twisted pair cable, and coaxial cable, as well as supporting infrastructure, required to establish voice, data, and CATV/closed-circuit television facilities throughout the project site.
2. The primary communications room which serves as the head end for the project site will maintain a consistent temperature of no greater than 80 degrees Fahrenheit, measured at the surface of the powered equipment in the equipment racks.

Part 2: Products

2.01 PRODUCTS

A. General Materials Requirements

1. All materials shall be the most current model or type offered by each manufacturer, shall conform to current applicable industry standards, NEMA standards, approved by the Underwriter's Laboratory.
2. Equipment and materials shall comply with EIA/TIA, IEEE, NEC, NEMA, IPCEA< ANSI, and ASTM standards.
3. Additional Equipment: The contractor shall furnish and install all additional equipment and appurtenances required for a complete, ready for use, installation.

B. Materials Specification – Structured Cabling Systems

1. Fiber Optic Cable & Connectivity:

i. Cables:

- a. Description: Multimode optical fiber, OM3 (50/125-micron), plenum rated non-conductive (OFNP) with aqua jacket.
- b. Strands Per Cable: Middle/High Schools - 12 minimum, Elementary Schools – 6 Minimum.
- c. Maximum Attenuation: -3.5 dB/km at 850 nm; -1.5 dB/km at 1300 nm.
- d. Operating Temperature Range: -20 to 70 deg C.
- e. Manufacturer: Corning Fiber, Siemon equivalent.

ii. Cable Connectors: Simplex- and duplex-type SC couplers with self-centering, axial alignment mechanisms. Insertion loss not greater than 0.7dB.

iii. Patch Panels:

- a. A modular panel housing multiple-numbered duplex cable connectors with integral connection plates and pigtail splice tray.
- b. Permanent Connection: One end of each connector module is permanently connected to an installed cable fiber.
- c. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to satisfy specified expansion criteria.

- d. Mounting: Rack mounted.
 - e. Manufacturer: Siemon, Part #FCP3-DWR.
2. Unshielded Twisted Pair (UTP) Cable & Connectivity:
- i. Backbone Cable:
 - a. Description: 25-pair conductor cable of No. 24 AWG color-coded insulated conductors, plenum rated (CMP), gray jacket.
 - b. Manufacturer: Mohawk, CommScope equivalent.
 - ii. Horizontal Cable:
 - a. Description: 4-pair twisted pair conductor cable of No. 24 AWG color-coded insulated conductors, Category 5e compliant, plenum rated (CMP).
 - b. Manufacturer: Mohawk MegaLAN M55988, CommScope Ultra11 5504M equivalent.
 - iii. UTP Patch Panels:
 - a. Horizontal Cable:
 - 1. Category 5e, 48 port, RJ45, EIA 568 with 110 type IDC connectors. Modular panel mounting with multiple, numbered jack units.
 - b. Copper Backbone:
 - 1. Category 5e, 48 port, RJ45, EIA 568 with 110 type IDC connectors. Modular panel mounting with multiple, numbered jack units.
 - c. Number of Jacks per Field: 1 for each 4-pair cable indicated in the design, plus spares and blank positions adequate to satisfy specified expansion criteria.
 - d. Manufacturer:
 - 1. Siemon, Part #HD5-48 for Horizontal Cable and for Copper Backbone Cable patchpanels.
 - iv. Workstation Outlets
 - a. Voice/Data Outlet Faceplate:
 - 1. Single Gang modular faceplate, number of ports as required, white color.
 - 2. Manufacturer: Siemon #MX-FP-S-o*-02 (* indicates number of ports).
 - b. Wall Phone Outlet Faceplate and Outlet:
 - 1. Stainless Steel for Keystone Modules.
 - 2. Manufacturer: Siemon Part #MX-WP-CS-SS.
 - c. Voice/Data Outlet Modules:
 - 1. Category 5e modules, white color.
 - 2. Manufacturer: Siemon Part #MX5-FO2.
 - d. Mounting: Flush, with jacks flush mounted.
3. Coaxial Cable & Connectivity:
- i. Backbone Cable:
 - a. Description: Series 11 (RG11/U) coaxial cable with copper-plated center conductor, plenum rated (CMP/CATVP), black jacket.
 - b. Manufacturer: CommScope or Belden
 - ii. Horizontal Cable:
 - a. Description: Series 6 (RG6/U) coaxial cable with copper-plated center conductor, plenum rated (CMP/CATVP), black jacket.
 - b. Manufacturer: CommScope or Belden

- iii. Outlet:
 - a. 75-ohm F-type self-terminating outlet with coverplate.
 - b. Manufacturer: Blonder Tongue 3184.

C. Materials Specification – Supporting Hardware

- 1. Horizontal Cable Supports:
 - i. Supports similar to Caddy Multi-function Clip No. 4-Z-3-4 and Bridle Ring No. 2-BRT-20.
 - ii. Attach cable supports to new suspension wires, separate from ceiling suspension wires.
- 2. Telecommunications Terminal Board (TTB):
 - i. ¾-inch AC-grade, fire-resistant-treated plywood mounted the entire length of the wall.
- 3. Equipment Racks:
 - i. EIA-standard 19" two-post with 12/24 tapped holes (or equivalent).
 - ii. Freestanding modular steel units designed for telecommunications terminal support and coordinated with dimensions of the units to be supported.
 - iii. Equipment rack shall be fastened to floor with anchor bolts.
 - iv. Manufacturer: Chatsworth Products Inc., Part #55053-7031.
 - v. 6" double-sided cable management outside racks, 10" double-sided cable management between racks.
- 4. Ladder Rack (Cable Runway):
 - i. Provide horizontally mounted ladder rack where cable is to be run horizontally in each telecommunication room.
 - ii. Provide horizontally mounted ladder rack from wall of telecommunication room to each equipment rack.
 - iii. Provide vertically mounted ladder rack where cable is to be run vertically in each telecommunication room.
 - iv. All ladder rack shall be 12" wide nominal, black powder coated. Chatsworth Products Universal Cable Runway. Provide all necessary mounting brackets, supports, and appurtenances.
 - v. Provide radius dropouts to each rack.
- 5. Outlet and Junction Boxes:
 - i. Outlet boxes shall be sheet metal type, 4-11/16" square x 2-1/2" deep, unless noted otherwise. Provide single-gang device ring.
 - ii. Junction and pull boxes shall be sheet metal type, sized as necessary for quantity of conduits applicable.
 - a. Junction or pull boxes may NOT be used to change pathway direction.
- 6. Conduit:
 - i. Refer to Electrical Specifications (Division 26).
 - ii. EMT conduits are preferred for above ground installation.
 - iii. Schedule 40 PVC conduits are preferred for underground/buried installation.
 - iv. Provide ENT (Carlton) innerduct for optical fiber through pathways where fiber backbones are to be installed. Innerduct shall be minimum 1".

Part 3: Execution

3.01 Installation

A. INSTALLATION

1. Install structured cabling system in accordance with the following:
 - i. Applicable edition of the National Electrical Code (NEC)
 - ii. National Electrical Contractors Association's "Standard of Installation"
 - iii. ANSI/TIA/EIA standards
 - iv. BICSI recommended practices
2. Label all pull and junction boxes with clearly marked "VOICE/DATA".
3. Install 1-inch conduit, minimum, from each voice/data outlet to nearest above ceiling space.
 - i. Conduits shall be appropriate for the purpose, and as otherwise required or permitted in Electrical Raceways.
 - ii. Provide protective bushings on all ends of conduits.
4. Install a 200-pound nylon pull cord in each empty raceway.
5. All Voice and Data cable from the outlet location to the communication closet shall be in separate bundles and shall be terminated on separate terminal hardware.
6. Wiring hardware, D-rings, mushroom spools, and appurtenances shall be provided as needed.
7. IDF Closets:
 - i. Data Termination Patch Panels are to be mounted in relay racks located in the Equipment Rooms.
 - ii. "D" Rings are to be installed on the backboards to accommodate proper wire, jumper and patch cord management to the "Voice" punch down blocks and to the "Data Termination Patch Panels".
8. Installation above ceilings:
 - i. Where conduit is required, the minimum size shall be 1 inch.
 - ii. Each conduit run shall be from the wall outlet and terminated in the ceiling space.
 - iii. Conduit is required only above non-accessible ceiling.
 - iv. Where conduit is not required, the cable is to be run using cable supports.
 - v. Hangers must be at least 18" above ceiling tiles and light fixtures. Rings must be a maximum of 4' on center.
 - vi. No more than 6 cables may be placed in a single 1 ¼" ring.
 - vii. Rings used may not exceed 1 ¼" diameter when suspended from suspension wires.
 - viii. Larger rings with more cables may be used in areas where space does not permit installation of cable tray.
 - ix. Rings must be run perpendicular to tray and parallel to walls.
 - x. No more than 1 clip may be used on each suspension wire.
 - xi. Ceiling must not be distorted or pulled out of alignment by clip installation.
 - xii. Never under any circumstances use water pipes, sprinkler pipes, electrical conduits, or HVAC ducts as a method of cable supports.

- xiii. All cables can be installed perpendicular (across) electrical conduits, but never parallel.
 - xiv. Cables installed through firewalls should be “sleeved” with a metallic nipple, adequately cemented in place and filled with an approved fire seal.
 - xv. The bridge rings used are not to exceed 60% fill.
9. Conduit: For conduit use where cable makes a 90 degree turn, a junction box is to be installed. Junction boxes shall be minimum 8x8 in size.
10. All trash and refuse shall be removed at the completion of each workday.
11. Plenum rated cable is to be used in all return air spaces.

B. HORIZONTAL DISTRIBUTION

1. Furnish and install a local area network secondary cable support system and install/terminate/test/label the cable, station jacks and patch panels.
2. Pull cables without exceeding cable manufacturer’s recommended pulling tensions. Do not bend cable in handling or installation to smaller radii than minimums recommended by manufacturers.
3. Details on the number and location of voice/data outlets are required on the premises TO BE ON THE DRAWINGS. Note that each outlet location is distinct and may be wired with more than one cable.
4. Cables shall be routed starting at the patch panels and leave the equipment rooms through the ceiling and terminate at the designated station jack. Cables shall be run to each location. Where cables enter the conduit, the cables shall have a gradual curve secured with a cable tie outside the entrance.
5. Cable Ties – Cables shall be bundled and attached to the primary and secondary support system at least every 3 feet. Cable ties shall be plenum rated.
6. Cable Support System – The Contractor shall install a cable support system that will eliminate cable sag and tension. This system shall consist of cable tray, raceways, bridge rings, J-hooks or catenary wire. These cable bundles must be attached to the support system at least every 3 feet.
7. Certification – Certify each cable to meet Category 5e standards in accordance with the wire type installed, and the field test specifications defined in ANSI/TIA-568-C.2 “Commercial balanced twisted-pair telecommunications cabling and components standard.”
8. Zone wiring using 25-pair or longer cable runs is not permitted for horizontal wiring. Use of bridges or multiples is not permitted.
9. Examine pathway elements to receive cable. Check raceways and other elements for compliance with space allocations, installation tolerances, hazards to cable installation,

and other conditions affecting installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

10. Install exposed cable parallel and perpendicular to surfaces or exposed structural members, and follow surface contours where possible.

C. INSTALLATION IN WALLS

1. Install $\frac{3}{4}$ " conduit down wall and connect to box secured to wall studs. Where conduit is installed above ceiling, this shall be an extension of that conduit.
2. If conduit is not installed above ceiling, the conduit in the wall shall extend 8" above ceiling and turn 90 degrees into ceiling space. Install a bushing on conduit end to protect wire.
3. No more than (6) six, 4-pair cables may be placed in 1" conduit.

D. INSTALLATION OF FIRE SEALS

1. When installing sleeves, conduit, or cable through an existing fire barrier and the existing fire barrier is to remain or be patched, the fire and smoke sealant to be installed shall be of the same manufacturer as the existing.
2. After installation of sleeves, wall penetrations, and cores, install sealant to contain smoke and fire up to 2,000 degrees Fahrenheit for 2 hours.
3. Remove damming materials after curing if made of other than fire resistant materials.
4. Protect materials from damage on surfaces subject to traffic.
5. Environmental Requirements;
 - i. Keep flammable materials away from sparks or flame.
 - ii. Provide masking and drop cloths to prevent contamination of adjacent surfaces by fire stopping materials.

E. PULL CORD

1. A pull cord is to be left in all conduit runs and cable supports. (jetline #232) or equivalent.

F. CABLE LABELING

1. Each cable shall be labeled with the corresponding alphanumeric information in the following format: CR-PP-PT, where CR is the Communication Room Number, PP is the patch panel letter, and PT is the patch panel port. The CR number shall be as follows:
 - i. The patch panels shall be lettered starting with "A" at the top of the rack. The port numbers shall correspond to the port number on the patch panel.
2. Labels – each cable shall be labeled on both ends using a vinyl overwrap label. All station jacks (wall bezel) and patch panels shall also be labeled. Labels shall be printed in a 10 point or greater font and shall be applied not less than 3-inches or more than 4-inches from each termination connector. The clear portion of the label shall completely overwrap the label data.

G. TELECOMMUNICATIONS INTERIOR DISTRIBUTION

1. The cross-connect hardware must be designed for flexibility to allow the system to expand up to 50% without the addition of racks, panels, etc.
2. The distribution system design must allow the customer to administer the communication system. Easy station arrangements must be built in.
3. Codes and Standards: The work shall comply with codes and standards applicable to each type of work and as listed these specifications.
4. Equipment: Prior to ordering equipment, verify dimensions and functions of equipment proposed for use. Be certain the equipment is compatible with the structural and architectural features of the work, avoids conflicts with equipment of other crafts, and that it will fit in the space provided.

H. TERMINATION BACKBOARDS (TTBs)

1. Install A-face of backboard plywood facing into room.
2. Finish paint termination backboards with durable enamel prior to installation of wall-mounted equipment.
 - i. Paint backboard area designated for service provider demarcations ORANGE.
 - ii. Paint all other backboard surfaces WHITE.
3. Install termination backboards plumb, and attach securely at each corner.
4. Install #200 nylon pull cord in each empty telephone conduit containing bends or over 10 feet in length.
5. Paint all backboards for demarcation equipment orange.

I. CABLE RELOCATIONS

1. Cables and outlets to be relocated for any reason must be preapproved by a PSD IT Dept. representative.
2. Cables and outlets approved for relocation will not be moved to locations outside of the room number in which they already reside.
3. Cables approved for relocation, which are too short to reach their new location, will be completely removed from walls, ceiling space and patch panel. New cables will be installed in their place, and terminated on the same patch panel and port to retain their wire numbers.

J. CABLE REMOVAL

1. Cables to be removed for any reason must be preapproved by a PSD IT Dept. representative.
2. Cables approved for removal will be completely removed from the walls, ceiling space and patch panels.
3. Cables approved for removal will be documented with their corresponding wire numbers on a spreadsheet, and submitted to Owner's Representative prior to the Substantial Completion phase of a project.

3.02 GROUNDING & BONDING

- A. Grounding and Bonding system shall comply with ANSI J-STD-607.

1. All racks, frames and miscellaneous equipment shall be grounded together using green, No. 6 insulated copper ground wire (low smoke, plenum rated, 6 AWG, 600V, UL listed, 90C) so that all equipment, communications racks and frames are at the same ground potential. A VOM measurement between any two points on racks and equipment cases in the communications room shall be less than 1.25 volts dc or ac potential.
2. The MDF shall have a Telecommunications Main Grounding Busbar (TMGB). All metallic components shall be bonded to this TMGB with compression-style connectors.
3. Each IDF shall have a Telecommunications Grounding Busbar (TGB). All metallic components shall be bonded to this TGB with compression-style connectors.
4. Each TMGB and TGB shall be bonded to building steel.
5. Each TGB shall be bonded to the ground bus in the electrical panel serving power to IDF.
6. The TMGB shall be bonded to the building's main electrical distribution panel ground bus.
7. Separate ground rods are NOT allowed.
8. Bond circuit and service protectors to TMGB.
9. Bond cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common mode returns, noise pickup, cross talk and other impairments. Bond shields and drain conductors to ground at only one point in each circuit.

3.03 SYSTEM INSPECTION AND TESTING

- A. Minimum of one (1) week written notice before all testing.
- B. Before any testing begins all voice and data station cables for wall and modular furniture installation shall be terminated in the IDF closet.
- C. First Testing Inspection:
 1. Testing shall be in the presence of the Owner's Representative.
 2. Testing shall begin before overhead cover-up, and only wall outlet installations and overhead cabling shall be tested and inspected.
 3. A complete log of these testing results shall be submitted before the Second Testing Inspection and use of cable.
- D. Second Testing Inspection:
 1. Shall be in the presence of the Owner's Representative.
 2. Shall begin after all outlet installations are completed.
 3. A complete log of these testing results shall be submitted before the use of cable.
- E. Any cable deficiency shall be corrected at the time that it has been discovered.
- F. A complete log of the test results shall be submitted to Owner's Representative and the Owner's designated Agent.
- G. CABLE TESTING
 1. Upon installation of cable and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance. Remove temporary connections when tests have been satisfactorily completed.
 2. Category 5e cables should be tested for: wire map, length, insertion loss, NEXT loss, PS NEXT loss, ACR-F loss, PS ACR-F loss, return loss, propagation delay, delay skew using a

level IIe field tester and certified to meet Category 5e standards in accordance with the wire type installed, and the field test specifications defined in ANSI/TIA-568-C.2 “Commercial balanced twisted-pair telecommunications cabling and components standard.” Backbone cables that are not Cat. 5e should at least be tested for signal path continuity and shorts and wire map.

3. Fiber-Optic Cable Procedures: Perform each visual and mechanical inspection and electrical test, including optional procedures, stated in NETA ATS. Certify compliance with test parameters and manufacturer’s recommendations.
4. All test results must be submitted to Owner’s Representative prior to the Substantial Completion of the project.