

EXHIBIT 1

SAN RAMON VALLEY UNIF SCH DIST REVISED FUNDING COMMITMENT DECISION LETTER

Revised Funding Commitment Decision Letter

Funding Year 2018

Contact Information:

Greg Pitzer
SAN RAMON VALLEY UNIF SCH DIST
699 OLD ORCHARD DR
DANVILLE, CA 94526
gpitzer@srvusd.net

BEN: 144183**Post Commitment Wave:** 8

Totals

Original Commitment Amount	\$0.00
Revised Commitment Amount	\$0.00

What is in this letter?

Thank you for submitting your post-commitment request for **Funding Year 2018 Schools and Libraries Program (E-rate) funding**. Attached to this letter, you will find the revised funding statuses and/or post commitment changes to the original Funding Commitment Decision Letter (FCDL) you received. Below are the changes that were made:

- Appeals
- Appeals
- Appeals

The Universal Service Administrative Company (USAC) is providing this information to both the applicant(s) and the service provider(s) so that all parties are aware of the post-commitment changes related to their funding requests and can work together to complete the funding process for these requests.

Next Steps

1. **File the FCC Form 486**, Service Confirmation and Children's Internet Protection Act (CIPA) Certification Form, for any FRNs included in this RFCDL, if you have not already done so. Please review the CIPA requirements and file the form(s).



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- o **If USAC approved funding on an FRN in your original FCDL**, the deadline to submit the FCC Form 486 is 120 days from the date of the original FCDL or from the service start date (whichever is later).
 - o **If a new FRN was created for this RFCDL or funding was not approved on an FRN in your original FCDL but is approved in this RFCDL**, the deadline to submit the FCC Form 486 is 120 days from the date of this RFCDL or from the service start date (whichever is later).
2. **Invoice USAC**, if you or your service provider have not already done so. Work with your service provider(s) to determine if your bills will be discounted or if you will request reimbursement from USAC after paying your bills in full.
- **If you (the applicant) are invoicing USAC:** You must pay your service provider(s) the full cost for the services you receive and file the [FCC Form 472](#), the Billed Entity Applicant Reimbursement (BEAR) Form, to invoice USAC for reimbursement of the discounted amount.
 - **If your service provider(s) is invoicing USAC:** The service provider(s) must provide services, bill the applicant for the non-discounted share, and file the [FCC Form 474](#), the Service Provider Invoice (SPI) form, to invoice USAC for reimbursement for the discounted portion of costs. Every funding year, service providers must file an [FCC Form 473](#), the Service Provider Annual Certification Form, to be able to submit invoices and to receive disbursements.
 - **To receive an invoice deadline extension, the applicant or service provider** must request an extension on or before the last date to invoice. **If you anticipate, for any reason, that invoices cannot be filed on time**, USAC will grant a one-time, 120-day invoice deadline extension if timely requested.

How to Appeal or Request a Waiver of a Decision

You can appeal or request a waiver of a decision in this letter **within 60 calendar days** of the date of this letter. Failure to meet this deadline will result in an automatic dismissal of your appeal or waiver request.

Note: The Federal Communications Commission (FCC) will not accept appeals of USAC decisions that have not first been appealed to USAC. However, if you are seeking a waiver of E-rate program rules, you must submit your request to the FCC and not to USAC. USAC is not able to waive the E-rate program rules.

- **To submit your appeal to USAC**, visit the Appeals section in the [E-rate Productivity Center \(EPC\)](#) and provide the required information. USAC will reply to your appeal submissions to confirm receipt. Visit USAC's [website](#) for additional information on submitting an appeal to USAC, including step-by-step instructions.
- **To request a waiver of the FCC's rules or appeal USAC's appeal decision**, please submit it to the FCC in proceeding number CC Docket No. 02-6 using the [Electronic Comment Filing System](#) (ECFS). Include your contact information, a statement that your filing is a waiver request,



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identifying information, the FCC rule(s) for which you are seeking a waiver, a full description of the relevant facts that you believe support your waiver request and any related relief, and any supporting documentation.

For appeals to USAC or to the FCC, be sure to keep a copy of your entire appeal, including any correspondence and documentation, and provide a copy to the affected service provider(s).

Obligation to Pay Non-Discount Portion

Applicants are required to pay the non-discount portion of the cost of the eligible products and/or services to their service providers. Service providers are required to bill applicants for the non-discount portion of costs for the eligible products and/or services. The FCC stated that requiring applicants to pay the non-discounted share of costs ensures efficiency and accountability in the program. If using the BEAR invoicing method, the applicant must pay the service provider in full (the non-discount plus discount portion) **before** seeking reimbursement from USAC. If using the SPI invoicing method, the service provider must first bill the applicant **before** invoicing USAC.

Notice on Rules and Funds Availability

The applicants' receipt of funding commitments is contingent on their compliance with all statutory, regulatory, and procedural requirements of the Schools and Libraries Program and the FCC's rules. Applicants who have received funding commitments continue to be subject to audits and other reviews that USAC and/or the FCC may undertake periodically to assure that funds that have been committed are being used in accordance with such requirements. USAC may be required to reduce or cancel funding commitments that were not issued in accordance with such requirements, whether due to action or inaction, including but not limited to that by USAC, the applicant, or the service provider. USAC, and other appropriate authorities (including but not limited to the FCC), may pursue enforcement actions and other means of recourse to collect improperly disbursed funds.



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Revised Funding Commitment Decision Overview

Funding Year 2018

Funding Request Number (FRN)	Service Provider Name	Request Type	Revised Committed	Review Status
1899067688	Digital Design Communications	Appeals	\$0.00	Denied
1899067716	Digital Design Communications	Appeals	\$0.00	Denied
1899067743	Digital Design Communications	Appeals	\$0.00	Denied



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Post Commitment Request Number: 122830	Post Commitment Request Type: Appeals	Post Commitment Decision: Denied
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FRN: 1899067688	Service Type: Internal Connections	Original Status: Denied	Revised Status: Denied
FCC Form 471: 181035231			

Dollars Committed			
Monthly Cost		One-Time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$15,686.06
Total Pre-Discount Charges		\$15,686.06	
Discount Rate		40.00%	
Revised Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Revised Funding Commitment Decision Comments:

Post Commitment Rationale:

USAC denied your Funding Request Number (FRN) because the description of the products and services on the cited FCC Form 470 180014601 for all of the products and/or services in the FRN 1899067688 contains a particular manufacturer's name, brand, products and/or services without also specifying or equivalent. This is a competitive bidding violation because there is no indication that FCC Form 470/RFP is also allowing a service provider to submit a bid for equivalent products and/or services. This undermines the competitive bidding process by eliminating the opportunity for the applicant to purchase an equivalent or better product that may be less expensive or to choose a less expensive service provider. In your appeal, you have not shown that USAC's determination was incorrect. Consequently, USAC denies your appeal. FCC rules require applicants to submit a complete description of the



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services they seek so that it may be posted for competing service providers to evaluate and this application must describe the services that the schools and libraries seek to purchase in sufficient detail to enable potential providers to formulate bids. See Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Report and Order, 12 FCC Rcd 8776, 9076, and 9078-79, FCC 97-157 para. 575 (rel. May 8, 1997). Additionally, FCC rules require that, except under limited circumstances, an eligible school, library or consortium that includes an eligible school or library shall seek competitive bids for all services eligible for support and must conduct a fair and open competitive bidding process. See 47 C.F.R. sec. 54.503(a) and (b). When an applicant includes a manufacturer's name or brand for its description of requested services on the FCC Form 470, there is a risk of compromising the competitive bidding process for services requested. The FCC has clarified that, for FCC Form 470s or RFPs posted for Funding Year 2013 or thereafter, applicants must not include the manufacturer's name or brand on their FCC Form 470 or in their RFPs unless they also use the words or equivalent to describe the requested product or service. Such a description (or equivalent) will prevent the FCC Form 470 or RFPs from being construed as requiring only a specific product or service provider, which could undermine the competitive bidding process by eliminating the opportunity for the applicant to purchase an equivalent or better product that may be less expensive or to choose a less expensive service provider. See Request for Review of a Decision of the Universal Service Administrator by Queen of Peace High School, Burbank, Illinois, Schools and Libraries Universal Service Support Mechanism, File No. SLD-667006, CC Docket No. 02-6, Order, DA 11-1991 (rel. December 7, 2011).



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Post Commitment Request Number: 122830	Post Commitment Request Type: Appeals	Post Commitment Decision: Denied
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FRN: 1899067716	Service Type: Internal Connections	Original Status: Denied	Revised Status: Denied
FCC Form 471: 181035231			

Dollars Committed			
Monthly Cost		One-Time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$11,088.00
Total Pre-Discount Charges		\$11,088.00	
Discount Rate		40.00%	
Revised Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Revised Funding Commitment Decision Comments:

Post Commitment Rationale:

USAC denied your Funding Request Number (FRN) because the description of the products and services on the cited FCC Form 470 180014601 for all of the products and/or services in the FRN 1899067716 contains a particular manufacturer's name, brand, products and/or services without also specifying or equivalent. This is a competitive bidding violation because there is no indication that FCC Form 470/RFP is also allowing a service provider to submit a bid for equivalent products and/or services. This undermines the competitive bidding process by eliminating the opportunity for the applicant to purchase an equivalent or better product that may be less expensive or to choose a less expensive service provider. In your appeal, you have not shown that USAC's determination was incorrect. Consequently, USAC denies your appeal. FCC rules require applicants to submit a complete description of the



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Post Commitment Request Number: 122830	Post Commitment Request Type: Appeals	Post Commitment Decision: Denied
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FRN: 1899067743	Service Type: Internal Connections	Original Status: Denied	Revised Status: Denied
FCC Form 471: 181035231			

Dollars Committed			
Monthly Cost		One-Time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$28,588.00
Total Pre-Discount Charges		\$28,588.00	
Discount Rate		40.00%	
Revised Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Revised Funding Commitment Decision Comments:

Post Commitment Rationale:

USAC denied your Funding Request Number (FRN) because the description of the products and services on the cited FCC Form 470 180014601 for all of the products and/or services in the FRN 1899067743 contains a particular manufacturer's name, brand, products and/or services without also specifying or equivalent. This is a competitive bidding violation because there is no indication that FCC Form 470/RFP is also allowing a service provider to submit a bid for equivalent products and/or services. This undermines the competitive bidding process by eliminating the opportunity for the applicant to purchase an equivalent or better product that may be less expensive or to choose a less expensive service provider. In your appeal, you have not shown that USAC's determination was incorrect. Consequently, USAC denies your appeal. FCC rules require applicants to submit a complete description of the



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EXHIBIT 2

RFP 763 - WIRING MIDDLE SCHOOLS



San Ramon Valley Unified School District

Rick Schmitt, Superintendent

Request for Proposal #763

FORM 470#

Installation of Classroom Network Wiring

Responses must be received no later than:

March 1, 2018

Deliver response to the office of:

Jasmine Gacusan
Director of Purchasing
3280 Crow Canyon Road, San Ramon, CA 94583

E-Rate Year 21

BACKGROUND

ABOUT THE DISTRICT

The San Ramon Valley Unified School District encompasses the communities of Alamo, Blackhawk, Danville, Diablo, and San Ramon as well as a small portion of the cities of Walnut Creek and Pleasanton. The district is comprised of 36 schools serving more than 32,000 students in Kindergarten through Grade 12.

Facts and Figures

35 Schools (communities: Alamo, Blackhawk, Danville, Diablo, San Ramon)
22 elementary schools
8 middle schools
4 comprehensive high schools
1 continuation high school
1 independent study school

Enrollment and Personnel

Number of Students: 32,627
Number of Employees: 3146
 Number of Teachers: 1,632
 Number of Administrators: 117
 Number of Pupil Services Personnel: 86
 Number of Classified Staff: 1,311
Meals served per day: between 6,300 - 8,100

	2011-12	2012-13	2013-14	2015-16	2016-17	2018-19
Enrollment	29,989	30,757	31,407	32,255	32,424	32,627
Increase	2.5%	2.46%	2.12%	2.7%	0.5%	0.6%

2017-18 Operating Budget Revenues \$336,612,430
2017-18 Expenditures \$346,521,767

CALENDAR OF EVENTS

Event	Date	Communication Venue
Legal Advertisement	Jan 15 and Jan 22, 2018	San Ramon Valley Times and www.srvusd.net
Mandatory Site Walk	Los Cerros - January 31, 2018, 1:30 – 3:00 Stone Valley – January 31, 2018 3:30 – 4:30 Windemere – January 30, 2018 2:00 – 4:00	At school sites
Questions/Clarification Deadline	February 22, 2018 @ 11:00 am	gpitzer@srvusd.net
RFP Opening Date	March 1, 2018 @ 3:00 pm	Technology Conference Room
Evaluation Period	March 1- March 6, 2018	Technology Dept
Board Approval	March 13, 2018	District Office
Notice to Proceed	Week of March 19, 2018	Technology Dept

DEFINITIONS

ASB – Apparent Successful Bidder

CONTRACT – The resulting contract issued by the SRVUSD Purchasing Department, which is also at times Referred to herein as the “Agreement”, or as the “Master Purchase Agreement”.

PROPOSAL - The term “Bid” “proposal”, and Quote, are used interchangeably herein and refer to the bid submitted in response to this Request For Proposal (RFP).

PURCHASE ORDER (PO) - The documents to be furnished to the successful contractor(s) by SRVUSD Purchasing Department, specifically describes the work to be done and references back to the Master Purchase Agreement.

SAN RAMON VALLEY UNIFIED SCHOOL DISTRICT - The terms, “Owner”, “District”, “SRVUSD”, “Purchasing Director”, “Buyer”, “Department”, are used interchangeably herein and refer to the same entity: San Ramon Valley Unified School District

REQUESTOR – The terms “Requestor”, “requesting department”, “department”, “end user”, “school site” or “originator”, are interchangeably herein and refer to the same entity, the receiver of goods and services.

RFB, RFP or RFQ are used interchangeably and mean solicitation for pricing, proposal, quote, bid.

SELLER--- The term “Seller”, “Supplier”, “Contractor”, “Bidder”, “Respondent”, “Provider”, “Offeror” and “Vendor”, are used interchangeably herein and refer to the same entity, the provider of goods and services to the District.

WORK - “Work” shall include all obligations, duties, requirements, and responsibilities required for the successful completion of the Contract by the Seller, including the furnishing of all supervision, labor, materials, equipment and other supplies, incidental with the execution of the Contract and in accordance with the terms and conditions set forth in the Contract.

JOB SITE LOCATIONS

The work will be performed in San Ramon Valley Unified School District property in District owned or operated buildings.

1.0 INTRODUCTION:

The San Ramon Valley Unified School District (“District”) is requesting proposals for installation of network cabling from MDF to IDF and the IDF to classrooms infrastructure equipment at Los Cerros Middle School, 968 Blemer Rd, Danville, CA 94526; Windemere Ranch Middle School, 11611 E Branch Pkwy, San Ramon, CA 94582; and Stone Valley Middle School, 3001 Miranda Ave, Alamo, CA 94507. The District is soliciting qualified Vendors to submit a proposal for installation of the cables as described below. Materials will be provided by the district.

The work described in the proposal is designed to be completed between June 11, 2018 and August 3, 2018. Stone Valley Middle School and Windemere Ranch Middle School will be available for work from June 11, 2018 to July 6, 2018. Los Cerros Middle school will be available for work between July 9, 2018 to August 3, 2018.

Installation of wiring must adhere to district wiring standards posted at:
<http://www.srvusd.net/erateRFP>

2.0 TECHNICAL REQUIREMENTS

San Ramon Valley Unified School District is seeking proposals to install network wiring for Los Cerros, Stone Valley and Windemere Ranch Middle Schools. School maps are included as an appendix to this RFP. *Check the district website at <http://www.srvusd.net/erateRFP> for information.*

Minimum features required installing:

- Contractor must be Panduit-certified to install Panduit Cat 6A cables and terminations in Panduit raceways, existing pathways or above ceiling to maintain Panduit 30 year warranties.
- Contractor shall install and terminate owner furnished Cat 6A cables and jacks/ plugs from MDF/ IDF's to to locations as designated in classrooms.
- Contractor shall install and connect owner furnished Panduit pre-terminated fiber-optic cables and fiber cassettes from MDF to IDFs.
- Cables shall to be installed according district data spec documentation which can be found on the eRate RFP website: <http://www.srvusd.net/erateRFP>
- Testing of cables according to data spec documentation. Vendor must submit Fluke-Linkware (.flw) certification results prior to submittal to Panduit for warranty for review and correction for each cable on project to district project manager.
- Fiber-optic cables must be tested bi-directionally according to data spec documentation.
- Cables shall be identified and labeled according to cable identification schedule included.
- Patch panels shall be installed according to rack elevation drawings.

Vendor Note:

Panduit conduit and racks will be installed by the district. Pathways from MDF to each IDF are existing or will be installed by the district or other contractors prior to start of work. Wiring should include labor for installation and termination of cabling, racks, patch panels, faceplates and testing.

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General Terms and Conditions

1. Vendor shall indemnify, defend, and hold harmless SRVUSD from and against any loss, damage, claim, or harm for bodily injuries, including death, or damage to property caused by Vendor or its employees, sub-contractor, or suppliers in connection with the performance of this agreement.
2. Vendors must be able to comply with Federal E-rate regulations, including having a valid SPIN number. Proposals from Vendors without a SPIN number will not be considered. San Ramon Valley Unified School District and the successful Vendor will act in a reasonable manner and comply with any Schools and Libraries Universal Service Fund Program requirements as described under Section 254 of the Communications Act of 1934, as amended, 47 C.F.R. #254, and any competitive requirements contained in 47 C.F.R. #54.504.
3. The Vendor shall provide three references consisting of similar work and scope, including at least two references for work performed in California and covered by E-Rate funding.
4. The Vendor shall have a valid Service Provider Identification Number (SPIN) on file with the SLD and shall provide this number with their response.
5. The selected Vendor shall demonstrate that they have experience operating in and around school facilities, and shall certify that all employees working either directly for the Vendor or through a sub-contractor, when on or around a school facility, have passed any fingerprint or other mandated screenings required by law.
6. The selected Vendor understands and agrees that school session hours vary and that normal school operations are not disrupted during installation. While not required, District and Vendor agree that it may be necessary to perform some work pertaining to the Contract after hours or when school is not in session. Vendor shall perform such out-of-session work as is reasonably necessary and shall ensure that consideration of gaining access to facilities does not unreasonably inconvenience the District employees.

FOB Destination Pricing

Bidders must quote prices F.O.B. destination, to the delivery location. Pricing or discounts should be stated in the units specified herein and bidders should quote each manufacturer separately. The District is not obligated to pay shipping and handling charges, fuel surcharges, drayage or labor charges not indicated herein.

Evidence of Responsibility

Upon the request of the District, a bidder whose bid is under consideration for the award of the contract

Installation of Classroom Network Wiring – Middle Schools

shall submit promptly to the District satisfactory evidence showing the bidders financial resources, his experience in the field and his organization, general liability insurance, workers compensation, criminal background check certification or other factors contributing to the successful execution and completion of the contract.

Fingerprinting

Section 45125.1 of the California Education Code is hereby made part of this bid solicitation as if written in its entirety herein.

Warranty

Manufacturer's warranty must be included as part of any RFP. The supplier, manufacturer, or their assigned agent shall guarantee the product or service performed against all defects or failures of materials and workmanship for a period recommended by the manufacturer from the actual delivery date. Where applicable, all merchandise must be warranted to be in compliance with California energy, conservation, environmental, educational, and products liability standards.

Failure to Perform

The San Ramon Valley Unified School District, upon written notice to the Vendor, may immediately terminate this Contract should the Vendor fail to perform properly and correct any of its obligations hereunder or any substandard performance that is unacceptable to the District. In the event of such termination, the District may proceed with the work in any reasonable manner it chooses. The cost to the District of completing the Vendor's performance shall be deducted from any sum due to the Vendor under this Contract, without prejudice to the District's rights to recover damages.

Insurance Requirements

During the term of this agreement, Supplier will maintain and keep in force insurance of the types and in the minimum amounts set forth below:

Insurance	Minimum Limits of Liability
Worker's Compensation	\$1,000,000
Employer's Liability Comprehensive	\$1,000,000
General Liability	\$1,000,000 per occurrence/\$3,000,000 aggregate
Automobile Liability	\$1,000,000

All insurance policies must be primary. Within ten (10) days of the Effective Date, Vendor will provide District with certificates of insurance confirming that Vendor maintains required insurance, **along with a second page endorsement naming "the San Ramon Valley Unified School District, its board members, agents, attorneys, employees, and consultants" as additional insured under the respective policy.** All insurance policies and certificates of insurance will contain a provision for thirty (30) days advance notice to District of all, policy changes, including without limitation, cancellation. Supplier waives all rights of subrogation against District. Supplier's failure to comply with these requirements will constitute a material breach of this agreement. Supplier warrants that each of its significant subcontractors will maintain insurance coverage as described above.

Basis of Award

Proposals will be evaluated based on the cost of installation services.

District's Rights and Options

The District reserves the right to reject any and all proposals, to contract work with whomever and in whatever manner the District decides, to abandon the work entirely, or postpone selection for its own convenience, without indicating any reasons or to negotiate with any, all, or none of the respondents to the RFP. This RFP does not obligate the San Ramon Valley Unified School District to negotiate a contract. The District reserves the right to waive any informality or non-substantive irregularity as the interest of the District may require.

The San Ramon Valley USD reserves the right to increase or decrease quantities of order at the same price as it best suit the needs of the District.

Award of this RFP does not imply exclusive agreement with the San Ramon Valley Unified School District.

No interest in the contract shall be transferred to any other party without permission of the District.

Addenda or Bulletins

Any addenda or bulletins issued during the time of bidding shall form a part of the drawing and specifications issued to bidders for the preparation of their proposals and shall constitute a part of the contract documents.

REVIEW OF PROPOSALS AND AWARD:

The USAC-SLC Guidelines available at www.usac.org make it clear in Step 3 that applicants must use “an open and fair competitive bidding process” in order to qualify for E-Rate funding. Questions/Clarifications must be submitted by email to gpitzer@srvusd.net by February 22, 2018 at 11 am. Prospective Bidders are invited to walk the three sites on January 30 and 31, 2018. Proposals must be received, either in written form or electronically, no later than March 1, 2018 at 3:00 pm at which time the proposals will be opened and evaluated. The Board of Education will be asked to approve the successful service provider or to reject all proposals at the next scheduled Board meeting. The successful service provider must enter into a signed agreement no later than March 20, 2018.

Mandatory Site Visit Timeline

Mandatory Site walks for each school will be offered on **January 30th & 31st, 2018** at the following times:

School Site	Address	Date	Time
Los Cerros Middle School	968 Blemer Rd, Danville, CA 94526	January 31 th , 2018	1:30 – 3:00
Stone Valley Middle School	3001 Miranda Ave, Alamo, CA 94507	January 31 th , 2018	3:30-4:30
Windemere Ranch Middle School	11611 E Branch Pkwy, San Ramon, CA 94582	January 30 th , 2018	2:00 – 4:00

Clarification Deadline

All questions regarding RFP preparation, documents, discrepancies, omissions, the selection process, specifications and interpretations of the terms and conditions of the Request for Proposal (RFP) must be submitted in writing via email to gpitzer@srvusd.net with subject title: RFP CLARIFICATION, no later than **five working days** prior to the submittal date. Questions received after that date will not be answered. San Ramon Valley Unified School District is required to post both this RFP and Form 470 on the USAC EPC Portal site <http://www.usac.org/sl/tools/e-rate-productivity-center/default.aspx>. Questions and responses will be posted on the district's website and the EPC portal site. In the event that there is a discrepancy between in documentation posted in multiple locations, the controlling (master) document will always be located at www.srvusd.net/eraterfp

Public Records

All responses to the RFP will become the property of the District. Once a final award is made, all RFP responses, except financial and proprietary information, become a matter of public record and shall be regarded by the District as public records. The District shall not in any way be liable or responsible for the disclosure of any such records or portions thereof if the disclosure is made pursuant to a request under the Public Records Act.

If a Bidder believes that portions of a proposal constitute trade secrets or confidential or financial data, then the Bidder must so specify by, at a minimum, stamping in bold red letters, the term "CONFIDENTIAL" on that part of the proposal which the Bidder believes to be protected from disclosure. The Bidder must submit in writing specific detailed reasons, including any relevant legal authority, stating why the Bidder believes the material to be confidential or a trade secret. Vague and general claims as to confidentiality will not be accepted. The District will be the sole judge as to whether a claim is general and/or vague in nature. All offers and parts of offers that are not marked as confidential may be automatically considered public information after the contract is awarded. **The Bidder is hereby notified that the District may consider all or parts of the offer public information under applicable law even though marked confidential.**

In keeping with the USAC-SLD Guidelines to ensure a fair and open competitive bid process, any information provided to a potential service provider will be shared with all other potential service providers.

SCOPE OF PROJECT:

1. All work associated with this project may start no earlier than June 11, 2018 and must be completed by August 3, 2018.
2. Los Cerros Middle School
 - a. MDF
 - i. Install owner-provided pre-terminated fiber optic cables in pre-established pathways from MDF to each designated IDF.
 - ii. Install owner-provided fiber cassettes and connect pre-terminated fiber to cassette.
 - iii. Test all fiber to district specifications including bi-directional testing.
 - b. Classrooms
 - i. Install, terminate and test owner-provided CAT 6A cables to each identified classroom location in attached site plan.
 - ii. Each classroom will have 2 drops wired from IDF to locations in classrooms as designated in attached diagram.
 - iii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
 - c. Exterior Wireless Access Points
 - i. Install, terminate and test two owner-provided CAT 6A cables to designated exterior locations in all buildings as designated on attached site plan.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
 - d. Multi-Purpose Room
 - i. Install, terminate and test owner-provided CAT 6A cables to each identified locations.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
 - e. Administration Building
 - i. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
 - f. Library
 - i. Install, terminate and test owner-provided CAT 6A cables to each identified locations.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
 - iii. In the Library/ main classroom building, re-termination of existing Cat 5 cables at existing data rack into new owner provided Cat 6A Mini-com jacks and installation into new patch panels. This is for space consolidation. These cables will be tested as Cat 5.
3. Stone Valley Middle school
 - a. Administration Building
 - i. Install, terminate and test owner-provided CAT 6A cables to designated locations.
 - ii. Install, terminate and test two owner-provided CAT 6A cables to designated exterior locations in all buildings as designated on attached site plan.
 - iii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.

4. Windemere Ranch Middle School

- a. MDF
 - i. Install owner-provided pre-terminated fiber optic cables in pre-established pathways from MDF to P2 and P5 IDF's.
 - ii. Install owner-provided fiber cassettes and connect pre-terminated fiber to cassette.
 - iii. Test all fiber to district specifications including bi-directional testing.
- b. Classrooms
 - i. Install, terminate and test owner-provided CAT 6A cables to each identified classrooms in attached site plan.
 - ii. Each classroom will have 2 drops wired from IDF to locations in classrooms as designated in attached diagram.
 - iii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
- c. Exterior Wireless Access Points
 - i. Install, terminate and test two owner-provided CAT 6A cables to designated exterior locations as designated on attached site plan.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
- d. Multi-Purpose Room
 - i. Install, terminate and test owner-provided CAT 6A cables to designated locations.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
- e. Administration Building
 - i. Install, terminate and test owner-provided CAT 6A cables to designated locations.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.
- f. Library
 - i. Install, terminate and test owner-provided CAT 6A cables to designated locations.
 - ii. Cables will be run in pre-established pathways or above ceiling and terminated according to attached district networking standards.

THE REPRESENTATIVES MADE HEREIN ARE MADE UNDER PENALTY OF PERJURY.

NO BID IS VALID UNLESS SUBMITTED ON THIS FORM AND SIGNED BY AUTHORIZED
AGENT FOR YOUR COMPANY.

SUBMITTED BY:

COMPANY NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: _____ EMAIL: _____

SIGNATURE: _____ NAME: _____
(Authorized Agent) (Please Print)

TITLE: _____ DATE: _____

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; if bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partnership; and if bidder is an individual, his signature shall be placed above.

****THIS DOCUMENT MUST BE COMPLETED, EXECUTED AND SUBMITTED WITH THE BID FORM****

BIDDER'S REFERENCE AND STATEMENT OF EXPERIENCE

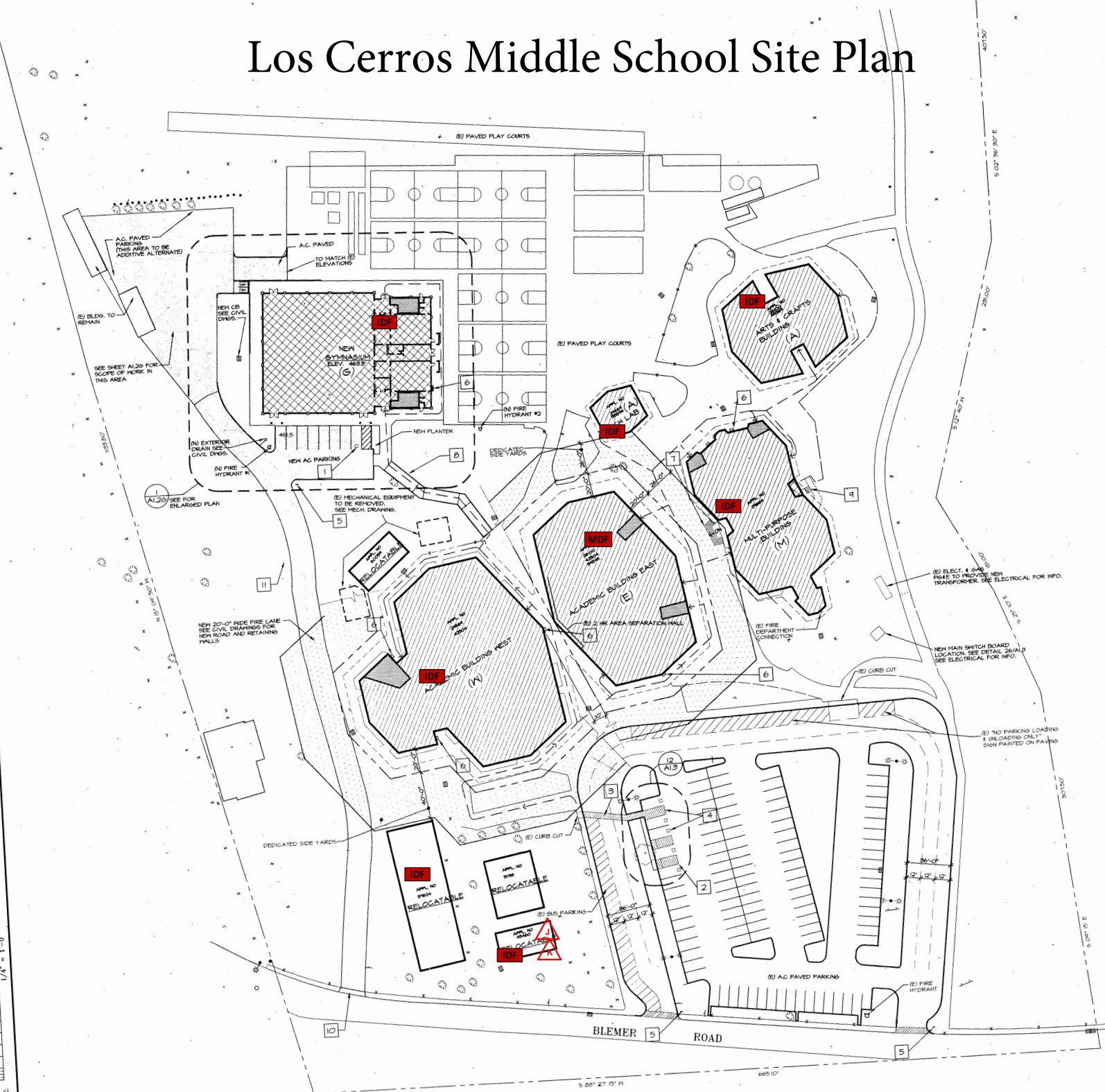
The bidder is required to state below work of similar character to that included in the proposed contract he has done and provide references which will fully disclose his responsibility, experience, skill and business standing. Please list below your qualified commercial OR government references of similar size contract within the last five (5) years:

Company Name	
Address	
Contact	
Phone #	
Email Address	
Name of Project	
Date/Period of Service	
Total Amount of Project	\$
Brief Description of Project:	

Company Name	
Address	
Contact	
Phone #	
Email Address	
Name of Project	
Date/Period of Service	
Total Amount of Project	\$
Brief Description of Project:	

Company Name	
Address	
Contact	
Phone #	
Email Address	
Name of Project	
Date/Period of Service	
Total Amount of Project	\$
Brief Description of Project:	

Los Cerros Middle School Site Plan



1 SITE PLAN
SCALE : 1"=40'-0"



TLCD ARCHITECTURE
111 Santa Rosa Avenue, Suite 300
Santa Rosa, CA 95404
707 525-5600
FAX 707 525-5616



RECORD DRAWINGS
WEST COAST CONTRACTORS, INC.

MIDDLE SCHOOL
AT
WINDEMERE BLVD
BOLLINGER CANYON ROAD
AND
EAST BRANCH PARKWAY
SAN RAMON, CALIFORNIA

SAN RAMON VALLEY
UNIFIED SCHOOL DISTRICT
699 OLD ORCHARD DRIVE
DANVILLE, CALIFORNIA

PROJECT NUMBER: 01083.00
DATE: September 12, 2003
DRAWN BY: DTH
CHECKED BY:
REVISIONS:

05619
FIRE MARSHAL
SITE PLAN
T-3









1	FIRE HYDRANT & PROTECTIVE BOLLARDS, SEE CIVIL DOCUMENTS.
2	(E) FIRE HYDRANT AT STREET, N.I.C.
3	16" Ø SWING GATE PER 23-25A1.6.
4	15' RADIUS FROM CLOSEST POINT OF EVA APPROACH TO COURTY.
5	NO PARKING SIGNAGE AT EACH ISLAND OF INSIDE DROP OFF LOOP AS SHOWN: NO STOPPING CNC-277058 1"

6	RED PAINTED CURBS AT INSIDE ON DROP OFF LOOP. ENTIRE LENGTH.
7	GATE VALVE & DETECTOR CHECK. EACH END OF FIRE LINE LOOP. SEE CIVIL DOCUMENTS.
8	EXTENT OF TRAFFIC RATED BASE & PAVING AT HARD COURT PLAY AREA. 40,000 POUND MINIMUM LOAD. SEE CIVIL DOCUMENTS.
9	STRIPPING & LETTERING: "FIRE LANE KEEP CLEAR".
10	16' SLIDING GATE AT ORNAMENTAL STEEL FENCING.
11	STANDING "EMERGENCY VEHICLES ONLY" (SEE CIVIL DOCUMENTS)

FIRE DEPARTMENT NOTES

1. IDENTIFY THE FIRE HYDRANT LOCATIONS BY INSTALLING REFLECTIVE "BLUE DOT" MARKERS ADJACENT TO THE HYDRANT "OFF" CENTER FROM THE MIDDLE OF THE STREET. (CFC 1998, sec. 907.4-3)
2. FIRE APPARATUS PROVIDES EMERGENCY VEHICLE ACCESS - EVA - ON PLANS TO BE MAINTAINED AND THE HYDRANTS IN SERVICE PRIOR TO COMMENCEMENT OF FRAMING.
3. PRIOR TO COMMENCEMENT OF FRAMING, CONTACT THE SAN JOAQUIN COUNTY FIRE DEPARTMENT TO OBTAIN THE LOCATION OF THE FIRE HYDRANTS. (CFC 1998, sec. 107H)
4. PROVIDE A WEED MAINTENANCE PROGRAM BEFORE, DURING AND AFTER CONSTRUCTION. MAINTAIN GRASS OR BRUSH CLEARANCE OF 100 FT. FROM THE HYDRANT. (CFC 1998, sec. 103.3.2, S.A.V.P. D-04 #17)
5. CONTRACTOR TO PROVIDE LOGBOOK CONTAINING NOTES TO CAMPUS GATES IN ACCORDANCE WITH FIRE DEPARTMENT STANDARDS. COORDINATE WITH

SYMBOLS:

- | | |
|---|--|
|  | FIRE DEPARTMENT CONNECTION |
|  | FIRE DEPARTMENT SHUT OFF VALVE
(EACH FLOOR AT 2 STORY BUILDINGS) |
|  | FIRE SPRINKLER RISER |
|  | POST INDICATOR VALVE |
|  | FIRE HYDRANT |
|  | 15' CLEAR VERTICAL CLEARANCE |
|  | ROAD SURFACE RATED TO 40,000 POUNDS MINIMUM LOAD, S.C.D. |
|  | EMERGENCY VEHICLE ACCESS PATH, PER FIRE PROTECTION DISTRICT STANDARDS. |

NOTE:

THIS DRAWING WAS FOR FIRE DEPARTMENT REVIEW. IT REPRESENTS
FIRE SAFETY INFORMATION RELATIVE TO FIRE DEPT. ACCESS &
EGRESS AND FIRE FLOW & FIRE HYDRANT LOCATIONS. FOR ALL
OTHER SITE INFORMATION REFER TO THE CIVIL DRAWINGS AND
ARCHITECTURAL SITE PLANS AT 1.1 THROUGH AT.5

LOCAL FIRE AUTHORITY REVIEW

- FIRE DEPARTMENT ACCESS, EGRESS AND GATE ENTRANCES HAVE BEEN REVIEWED FOR COMPLIANCE WITH TITLE 19, CALIFORNIA CODE OF REGULATIONS, CHAPTER 1.1 (ACCESS, EGRESS AND GATE ENTRANCES), SECTION 3.10 (GATE ENTRANCES).
 - FIRE FLOW AND FIRE HYDRANTS HAVE BEEN REVIEWED FOR COMPLIANCE WITH CALIFORNIA FIRE HYDRANT AND DISTRIBUTION. NOTED APPENDICES ARE FROM 1997 U.F.C. WITH CALIFORNIA AMENDMENTS.
 - IF RELOCATABLE(S): "SHORT TERM" _____ OR "LONG TERM" _____ USE.
- LOCAL FIRE AUTHORITY: SAN RAMON VALLEY FIRE PROTECTION DISTRICT

FIRE MARSHAL PARTIAL SITE PLAN

E-RATE SUPPLEMENTAL TERMS AND CONDITIONS

Signed copy to be returned with bid response.

The Telecommunications Act of 1996 established a fund by which Schools and Libraries across the Country could access discounts on eligible telecommunications products and services. The program is commonly known as the E-rate Program. The eligibility for discounts on internet access, telecommunications products and services, internal connection products, services and maintenance is determined by the Federal Communications Commission (FCC). Funding is made available upon application approval by the Schools and Libraries Division (SLD) of the Universal Service Administrative Company (USAC), which was established by the Act. The amount of discount is based on the numbers of students receiving free and reduced price meals.

1) E-RATE CONTINGENCY

The project herein may be contingent upon the approval of funding from the Universal Service Fund's Schools and Libraries Program, otherwise known as E-rate. Even after award of contract(s) and/or E-rate funding approval is obtained, the District may or may not proceed with the project, in whole or in part. Execution of the project, in whole or in part, is solely at the discretion of the District.

2) SERVICE PROVIDER REQUIREMENTS

The District expects Service Providers to make themselves thoroughly familiar with any rules or regulations regarding the E-rate program.

- a. Service Providers are required to be in full compliance with all current requirements and future requirements issued by the SLD throughout the contractual period of any contract entered into as a result of this RFP.
- b. Service Providers are responsible for providing a valid SPIN (Service Provider Identification Number). More information about obtaining a SPIN may be found at this website: <http://www.usac.org/sl/service-providers/step01/default.aspx>
- c. Service Providers are responsible for providing a valid Federal Communications Commission (FCC) Registration Number (FRN) at the time the bid is submitted. More information about obtaining an FRN may be found at this website: <https://fjallfoss.fcc.gov/coresWeb/publicHome.do>
- d. Service Providers are responsible for providing evidence of FCC Green Light Status at the time the bid is submitted. Any potential bidder found to be in Red Light Status will be disqualified from participation in the bidding process and will be considered non-responsive. More information about FCC Red and Green

Light Status may be found at this website:
http://www.fcc.gov/debt_collection/welcome.html

- e. Products and services must be delivered before billing can commence. At no time may the Service Provider invoice before July 1, 2018.
- f. Prices must be held firm for the duration of the associated E-rate Funding Year(s) or until all work associated with the project is complete (including any contract and USAC approved extensions).
- g. Goods and services provided shall be clearly designated as "E-rate Eligible". Non-eligible goods and services shall be clearly called out as 100% non-eligible or shall be "cost allocated" to show the percentage of eligible costs per SLD guidelines.
- h. Within one (1) week of award, the awarded Service Provider must provide the District a bill of materials using a completed USAC "Item 21 Template". Subsequent schedules of values and invoices for each site must match Item 21 Attachment or subsequent service substitutions. A summary sheet must also be provided to provide the cumulative amount for all sites.**
- i. In the event of questions during an E-rate pre-commitment review, post-commitment review and/or audit inquiry, the awarded Service Provider is expected to reply within 3 days to questions associated with its proposal.
- j. The awarded Service Provider is required to send copies of all forms and invoices to the District prior to invoicing USAC for pre-approval. Failure to comply with this requirement may result in the District placing the vendor on an "Invoice Check" with the USAC <http://www.usac.org/sl/applicants/step07/invoice-check.aspx>
- k. Services providers must comply with the FCC rules for Lowest Corresponding Price ("LCP"). Further details on LCP may be obtained at USAC's website: <http://www.usac.org/sl/service-providers/step02/lowest-corresponding-price.aspx>

3) SERVICE PROVIDER ACKNOWLEDGEMENTS

- a. The Service Provider acknowledges that no change in the products and/or services specified in this document will be allowed without prior written

approval from the district and a USAC service substitution approval with the exception of a Global Service Substitutions.

- b. The Service Provider acknowledges that all pricing and technology infrastructure information in its bid shall be considered as public and non-confidential pursuant to §54.504 (2)(i)(ii).
- c. The Service Provider acknowledges that its offer is considered to be the lowest corresponding price pursuant to § 54.511(b). Should it not be the lowest corresponding price, the service provider must disclose the conditions leading to the applicant being charged in excess of lowest corresponding price.
- d. This offer is in full compliance with USAC's Free Services Advisory <http://www.usac.org/sl/applicants/step02/free-services-advisory.aspx>. There are no free services offered that would predicate an artificial discount and preclude the applicant from paying its proportionate non-discounted share of costs. The service provider agrees to provide substantiating documentation to support this assertion should the applicant, USAC, or the FCC request it.

4) STARTING SERVICES/ADVANCE INSTALLATION – Category 1 Services


The annual E-rate Funding Year begins on July 1 and expires on June 30 of each calendar year. Regardless of the contract "effective date", E-rate eligible goods and/or services requested in this RFP shall be delivered no earlier than the start of the 2018 funding year (July 1, 2018). If Category 1 services (Telecommunication Services and Internet access) will begin on or shortly after July 1 of a funding year, the service provider, in some cases, may need to undertake some construction and installation work prior to the beginning of that funding year. Within the limitations indicated below, the infrastructure costs of a service provider can be deemed to be delivered at the same time that the associated Category 1 services begin. That is, if services begin on July 1, then the delivery of service provider infrastructure necessary for those services can be considered as also delivered on July 1. However, NO INVOICING can take place prior to July 1 of the associated Funding Year.

EARLY FUNDING CONDITIONS

Category 1

There are four conditions that must be met in order for USAC to provide support in a funding year for Category 1 infrastructure costs incurred prior to that funding year.

- *Initiation of installation cannot take place before selection of the service provider pursuant to a posted Form 470 and in any event no earlier than six months prior to July 1 of the funding year.*
- *The Category 1 service must depend on the installation of the infrastructure.*
- *The underlying Category 1 service cannot have a service start date prior to July 1 of the funding year.*
- *No invoices can be submitted to USAC for reimbursement prior to July 1 of the funding year.*

For more information, please refer to the FCC Order involving the Nassau County Board of Cooperative Educational Services (DA 02-3365 , released December 6, 2002). This FCC decision only applies to Priority 1 services (telecommunications services and Internet access).


The complete text can be found at the following URL:

<http://www.usac.org/sl/applicants/step05/installation.aspx>

Category 2

There is one condition that allows USAC to provide support in a funding year for Category 2 installation costs incurred prior to that funding year.

- *We also amend our rules for category two non-recurring services to permit applicants to seek support for category two eligible services purchased on or after April 1, three months prior to the start of funding year on July 1. This will provide schools with the flexibility to purchase equipment in preparation for the summer recess and provide the maximum amount of time during the summer to install these critical networks.*

For more information, please refer to the FCC Report and Order and Further Notice of Proposed Rulemaking ([FCC 14-99](#) , released July 23, 2014). This FCC decision only applies to Category 2 services (Internal Connections).

However, NO INVOICING can take place prior to July 1 of the funding year.

5) INVOICING

- a. The Service Provider agrees to bill and receive a portion of the payment for the provisions of goods and services described herein directly from USAC via the Form 474 Service Provider Invoice (SPI). The District will only be responsible for paying its non-discounted share of costs and does not intend to use the BEAR process (Form 472). The maximum percentage the District will be liable for is the pre-discount amount minus the funded amount as shown on the FCC Form 471 Block 5 and any identified ineligible costs. Upon the successful receipt or posting

of a Funding Commitment Decision Letter from the SLD and submission, certification and USAC approval of Form 486, the District shall pay only the discounted amount beginning with the billing cycle immediately following said approval. Alternatively, should the District decide that it is in the best interest of the District to file a Form 472, the District will inform the Service Provider of its intent.

- b. All Service Provider invoicing to USAC must be completed within 120 days from the last day of service. Should the Service Provider fail to invoice USAC in a timely manner, the District will only be responsible for paying its non-discounted share.

6) FCC/SLD AUDITABILITY

The E-rate program requires that all records be retained for at least ten (10) years from the last date of service provided on a particular funding request. Respondent hereby agrees to retain all books, records, and other documents relative to any Agreement resulting from this RFP for ten (10) years after final payment. The District, its authorized agents, and/or auditors reserves the right to perform or have performed an audit of the records of the Respondent and therefore shall have full access to and the right to examine any of said materials within a reasonable period of time during said period.

7) PROCUREMENT OF ADDITIONAL GOODS AND/OR SERVICES/COTERMINOUS EXPIRATION

During the term of any Agreement resulting from this RFP, the District may elect to procure additional or like goods and/or services offered by the Respondent. Such services shall be negotiated and obtained via an official amendment to this Agreement and approval by the District’s Governing Board. All terms, conditions, warranties, obligations, maintenance and support of said goods or services shall have a coterminous expiration date with the original date of this Agreement. The District shall not enter into a separate Agreement for said goods or services. Respondents must state in their proposal that they acknowledge, accept and are in agreement with coterminous expiration conditions.

I, the undersigned, as an authorized agent of _____ (Service Provider Name), hereby certify that I have read the E-rate Supplemental Terms and Conditions, am fully compliant and intend to cooperate with the E-rate process as outlined above.

Signature: _____ **Title:** _____

Phone Number: _____ **Email:** _____

Service Provider Name: _____

EXHIBIT 3
SRVUSD DATA SPECIFICATIONS

SECTION 27 00 00
NETWORKING, TELECOMMUNICATIONS, CATV SYSTEMS, IP CLOCK-SPEAKER, VoIP PHONE
AND AUDIO VISUAL SYSTEMS

SECTION 1 – PROJECT DESCRIPTION, GENERAL CONDITIONS

1.01 SUMMARY

A. WORK INCLUDED

1. Contractor shall be a currently registered Panduit Silver, Gold or Platinum Panduit Partner at the time of bid and installation.
2. These Specifications, together with the Drawings accompanying them, are intended to depict the installation requirements necessary to support this Project. Contractor shall furnish materials shown and/or called for on the Drawings but not mentioned in the Specifications, or vice versa, that are necessary for the installation and support of communications cabling, whether or not specifically called for in both. In addition, Contractor shall provide incidental equipment and materials required for the completion of systems included in this contract whether or not specified or shown on the Drawings.
3. Electrical Contractor shall review all requirements of this Section and coordinate with the data contractor where installing related components, providing electrical circuits, grounding and bonding or installing pathways and firestopping products. Installations shall comply with the requirements of this Section and details shown in the project drawings. When establishing data pathways, the electrical contractor shall coordinate with the data contractor to insure that no cable run will exceed the 90 meter distance limitation, jack to jack.
4. Complete structured data cabling systems (SCS) and hardware to create a campus local area network (LAN) as shown on drawings and called out in this specification. Structured cable systems to include manufacturers extended system warranties. See **Section 8.0** for contractor supplied equipment, installation and configuration responsibility.
5. Complete campus Fiber Optic Cable Backbone network shall be installed into new or integrated into existing campus systems.
6. Complete campus Telecommunications Grounding & Bonding System shall be installed into new or integrated into existing campus systems.
7. Where shown, a complete Cable Television (CATV) distribution cable system to include cabling and equipment, as detailed in this specification and in CATV Wiring and Distribution Plan shall be installed into new or integrated into existing campus systems.
8. Conduits as required for all data drops to extend from the MDF or IDF locations to each station faceplate or outlet. Cables may free air above accessible ceiling spaces but shall be installed in conduits where passing through non-accessible spaces. A non-accessible space is defined as a space that is closed off, covered or requires the use of a lift device or ladder greater than eight feet (8') to access. Pathway sizes must be calculated for the cable count and increased outside diameter of the Category 6A cable (.31" OD).
9. Installation of one or more 25 pair Category 5e twisted pair cables extending from the MPOE to the MDF as required for extending outside PSTN telephone lines into the data MDF. See drawings for specific count, termination requirement and routing.

10. Installation of one or more 6, 12 or 25 pair Category 5e backbone cable from campus MDF to each IDF to support analog phone line requirements. See Single Line Diagram for exact pair counts. Examples of such analog line uses are fire and intrusion alarm lines, energy management lines, outside pay telephones, elevator phones, and other support systems, as required in each building. See drawings for specific count and termination requirements. These cables may share the same conduit as the fiber optic data backbone cables running in a star configuration between the MDF and each building. Each building shall have a minimum of a single four-pair Category 5e cable run and terminated between the MDF and that building's IDF. MPR and gyms shall have a 25 pair cable installed. Cables shall be rated for the environment for which they are installed in.
11. Installation and termination of TWO (2) Cat 6A cables from each MDF/IDF to designated exterior security camera locations. Interior security cameras shall have one Cat 6A cable installed. Patch panel Jacks shall be GOLD in color and the camera ends shall be terminated in Field Terminable RJ45 Plugs (FP6X88MTG).
12. Installation and termination of Category 6A cables from each MDF/IDF to designated IP Clock Speaker locations. Patch panel Jacks shall be VIOLET in color and the Clock-Speaker ends shall be terminated in Field Terminable RJ45 Plugs (FP6X88MTG).
13. Installation and termination of Category 6A cables from each MDF/IDF to designated WAP locations as indicated by a Type "K" data jack.
14. Installation of specified speaker cables to support interior and exterior paging system speakers from each MDF/IDF. Cables to be installed in a star pattern and terminated on a terminal strip in the MDF/IDF as shown in the detail drawings.
15. Integration of new DATA, CATV, Audio Visual network systems and necessary support cabling with existing campus systems, where applicable, is required to be coordinated with the District Technology Project Manager.
16. Provide and install ancillary supporting infrastructure (e.g., innerduct, sleeves, surface mount raceway, E-Z Path Fire Rated Pathways, cable support/management systems, tie-wraps, etc.) for all network systems as specified herein. See Section 2.10 for approved products.
17. Provide and install wall or ceiling projector mounting assemblies in specified rooms, typically in standard classrooms, computer labs, libraries, MPR's or special purpose rooms. See drawings or specifications for specific locations, mounting fixtures and cables. Installation of specified video cables from multimedia faceplates to the projector is also required. Projectors are NIC.
18. Provide and install Audio and Projection System conduit infrastructure, control cabinets and related wiring in specified rooms. Typically in classrooms, libraries, theaters, Multi-Purpose Rooms or other special purpose rooms. See drawings and specifications for specific locations, requirements, cabling and other details. Where Audio Visual cables share a conduit with the data cabling, all cables shall be pulled in at the same time by the same contractor. Only specified cables shall be used.
19. Complete testing and certification of the Category 6A cable system to comply with the requirements of these specifications, amendments at the time of installation and;
 - a. ANSI/TIA-1152, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
 - b. ANSI/TIA-568-0.D, Generic Telecommunications Cabling for Customer Premises.

- c. ANSI/TIA-568-1.D, Commercial Building Telecommunications Cabling Standard
 - d. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard
 - e. ANSI/TIA 568 C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standards.
 - f. ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements.
20. Complete testing and certification of the fiber optic systems to comply with the requirements of these specifications, amendments at the time of installation and;
- a. ANSI Z136.2, For Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources
 - b. ANSI/EIA/TIA 455 50B, Light Launch Conditions For Long-Length Graded-Index Optical Fiber Spectral Attenuation Measurements
 - c. ANSI/TIA/EIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR
 - d. ANSI/TIA/EIA 455 60A, Measurement of Fiber or Cable Length Using an OTDR
 - e. ANSI/TIA/EIA 455 61A, Measurement of Fiber or Cable Attenuation Using an OTDR
 - f. ANSI/TIA/EIA 526 7, Optical Power Loss Measurements of Installed Single mode Fiber Cable Plant
 - g. ANSI/TIA 526 14 B, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed cable plant- Multimode attenuation measurement
 - h. TIA-TSB-4979 Practical Considerations for Implementation of Multimode Launch Conditions in the Field
 - i. ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises
 - j. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard
 - k. ANSI/TIA 568 C.3, Optical Fiber Cabling Components Standard
 - l. ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements
21. Fiber Optic system testing to include Optical Loss Test certification, OTDR certification, Visual endface inspection and image capture and Polarity Verification.
22. See **Section 8.1** for Supplied Projection System equipment, installation and configuration responsibility.

23. See **Section 8.2** for Supplied IP Clock Speaker equipment, installation and configuration responsibility.
24. For this project, the District requires that specific manufacturer's products and warranties be used to maintain consistency with an existing installed base within the District. See Section's 2.10 below and Section 8.0.
25. Discounted product pricing for the Panduit Structured Cabling Solution (SCS) is available. Bidders are advised to reference Panduit Quote # 2411N when pricing through an authorized distributor (Anixter, Graybar, CSC, Accu-Tech, Arrow Wire & Cable) or to contact the following representative for additional information.

Tim Lewis, Network Specialist
Ewing-Foley, Inc.-East Bay Representative
Office 408-342-2409
Cell 925-337-2878

26. See MDF / IDF Elevations and Plan views for specific construction, equipment placement and identification details.
27. See Standard Faceplate Port Configuration Types Drawing for data and multimedia jack configurations. Not all configurations as shown may be used on this project.
28. See Typical Classroom Patch Panel Layout Drawing for Port numbering scheme. See elsewhere in this specification for numbering requirements. All rooms shall be label with their final room number, not the architectural numbering. Arrangement and sequencing of the data jacks on the patch panels shall be based on the final room numbering.
29. See Detail Drawings for additional site specific requirements.
30. The data contractor shall be responsible for maintaining all active network systems in an operational state during the progress of a new or phased construction project. Contractor shall provide a detailed plan for maintaining systems to the District Technology Project Manager seventy-two (72) hours prior to the start of construction or network disruption. At no time during construction may an operational system be taken down, temporarily disconnected without approval and coordination with the District Technology Project Manager.
31. The General Contractor shall maintain the MDF and all IDF'S in a clean and operational state on New or Phased Renovation Projects at all times. The Data Contractor shall be responsible for cleaning his portion of the work during the course of construction. The room(s) shall be fully enclosed, dust seals installed on doors, air conditioning maintained in the MDF and ventilation maintained in all IDF's on a 24 hours per day, 7 days per week, 365 days per year basis. Operational MDF's shall have air conditioning capable of maintaining the room temperature at 68 degrees F. All Network equipment shall be protected from dust and contamination. Equipment shall not be covered in such a way that restricts the flow of cooling air or ventilation. On new projects, the MDF's and IDF's shall be fully completed and made available to the District Technology Project Manager two weeks minimum prior to the start of school. On renovation projects, the MDF's and IDF's shall be made available two weeks minimum prior to the scheduled cut over date. The District shall inspect these facilities prior to occupation and will notify the contractor of any deficiencies. The contractor will be given a 24 hour written notice of correction when any deficiency exists. If, after the 24 hour period any of the corrective conditions still remain, the District may take the necessary corrective action with the contractor responsible for the cost of correction. In addition,

- a. Where installed network equipment becomes dirty during the construction phase, the District shall hire its own vendor to clean and service the network equipment. The contractor shall be liable for this expense. Proper cleaning requires that equipment be opened up or disassembled to clean circuit boards, cooling fans and other internal components. This shall be completed by qualified individuals only. On active network equipment, this work shall be performed after hours.
- b. At the completion of the project, the MDF and/or all IDF rooms, network racks, wire management and other equipment in the MDF or IDF(s) shall be completely cleaned. Fiber optic panels shall be cleaned using data industry standard cleaning procedures for fiber optic connectors. Extreme care shall be taken to prevent endface damage to the fiber optic connectors. If the cleaning is not performed to District's satisfaction within the 24 hours written notice period, the District shall hire its own vendor to clean and service the network equipment with the general contractor being liable for this expense.
- c. At the completion of project, the District Technology Project Manager shall inspect its network equipment. If equipment is found to have excessive dirt contamination caused by construction, the District shall hire its own vendor to clean the equipment. The contractor shall be liable for this expense. Proper cleaning requires that equipment be opened up or disassembled to clean circuit boards, cooling fans and other internal components. This shall be completed by qualified individuals only. On active network equipment, this work shall be performed after hours.
- d. Where the network is operational and the sustained MDF room temperature exceeds 72 degrees F after 24 hour written notice, the District may take action to correct the condition with the general contractor being liable for this expense and liable for all heat related damage to network equipment.

29. REQUEST FOR INFORMATION (RFI's)

All questions concerning Data, Fiber Optics, Grounding and Bonding of Network Systems, Projection Systems, CATV or any other Network System referenced in this Section shall be addressed to the District Technology Project Manager through the general Contractor or architect. Contractor shall reference specific section numbers when submitting the RFI. All RFI's pertaining to Network Systems shall be answered by the District Technology Project Manager.

30. Data contractor shall coordinate with the electrical or installing contractor for all Surface Mount Horizontal and Vertical Raceways. Components are as specified in section 2.10.9.

- a. Provide and install required transitions, reducers or other fittings as required to maintain separate power and data pathways to the outlet.
- b. Raceways shall be secured to the wall with appropriate anchors.
- c. Raceways shall be sized for the numbers of data and electrical cables/conductors.
- d. Raceways shall be Panduit IW color.
- e. Specified Panduit LEFT/RIGHT and/or UP/DOWN terminations caps shall be used to maintain bend radius on data cables.

B. RELATED SECTIONS

The following Specification Sections may also apply.

1. 06 00 00 Wood, Plastics, Composites
2. 07 00 00 Thermal and Moisture Protection
07 84 00 Firestopping
3. 09 00 00 Finishes
09 20 00 Plaster and Gypsum Board
09 50 00 Ceilings
09 90 00 Painting
4. 10 00 00 Specialties
10 10 00 Information Specialties
10 20 00 Interior Specialties
5. 11 00 00/ Equipment
11 60 00 Audio-Visual
6. 12 00 00 Furnishings
12 30 00 Casework
7. 15 00 00/23 00 00 Mechanical
8. 16 00 00/ 26 00 00 Electrical
9. 25 00 00 Integrated Automation
10. 27 00 00 Communications
27 10 00 Structured Cabling
27 20 00 Data Communications
27 30 00 Voice Communications
27 40 00 Audio-Video Communications
27 50 00 Distributed Communications and Monitoring
11. 28 00 00 Electronic Safety and Security
28 10 00 Electronic Access Control and Intrusion Detection
28 20 00 Electronic Surveillance
28 30 00 Electronic Detection and Alarm
28 40 00 Electronic Monitoring and Control

C. OTHER WORK AND DESIGN REQUIREMENTS

Data contractor shall verify the following conditions exist prior to the start of construction. Where deficiencies exist, contractor shall bring this to the attention of the District Technology Director, Network Consultant/Designer, General Contractor, Project Manager and the Architect in writing.

1. MDF's shall include a dedicated air conditioning system capable of maintaining room temperature at 68 degrees F, 24 hours per day, 7 days per week, 365 days per year with all MDF active equipment running. Air conditioning shall be sized to allow for a twenty-five percent (25%) increase in load. Air conditioning equipment shall not be powered from the same distribution panel that serves the MDF active equipment. Air conditioning shall not be under EMS control.
2. All doors leading to the MDF and IDF's shall be solid core with no vents installed. Full perimeter weather-stripping and thresholds shall be installed.
3. IDF's shall include air conditioning or ventilation equipment capable of maintaining room temperature at 80 degrees F, 24 hours per day, 7 days per week, and 365 days per year. Equipment shall be sized to allow for a twenty-five percent (25%) increase in load. Air conditioning or ventilation equipment shall not be powered from the same distribution panel that serves the IDF active equipment. Air conditioning shall not be under EMS control.
4. Backbone and horizontal conduit pathways shall have adequate capacity for maintaining and replacing existing cables. Cable raceways shall not be filled

greater than the TIA/EIA-569-C maximum fill for the particular raceway type or sixty percent (60%). Conduits shall have no more than two 90-degree bends in 100 lineal feet. Pull boxes shall be placed every 100 lineal feet. In-ground boxes shall be set such that conduits enter above the floor of the box so that water and dirt do not flow back into the conduits.

5. Underground conduit system of sweeps, pull boxes, and conduits shall accommodate Fiber Optic, Multi-Pair Communication Cables and semi-rigid "hardline" CATV distribution cable free of kinks, jacket splits, or splices. Conduits feature a minimum bend radius of 18" for fiber optic and communications cables. Conduits feature a minimum conduit size of three inches (3") and a bend radius of thirty-six (36") for semi-rigid "hardline" CATV distribution cable. Conduit must be sized and bends designed to accommodate this type of cable. Runs shall have no more than two 90-degree bends in 100 lineal feet. Pull boxes shall be installed every 100 lineal feet. In-ground boxes shall be set such that conduits enter above the floor of the box so that water and dirt do not flow back into the conduits. Boxes shall have a six foot deep, six inch perforated, drain pipe filled with drain rock installed in box floor.
6. Conduits between buildings, rooms or other facilities shall not be daisy-chained. All conduit runs shall be designed in a star topology extending from the MDF to each IDF directly without passing through another building (daisy-chaining). Each conduit end shall be identified with labeling on the ends as well as on the as-built drawings. Multi-celled conduits are permitted with the individual cells meeting the requirements of these specifications.
7. Horizontal conduits, where installed in inaccessible spaces such as under-floors, floor access boxes, in walls and hard ceilings, shall home run, without daisy chaining, to the IDF or MDF. Conduits shall allow for a forty percent (40%) increase in capacity. Conduits shall have no more than two 90-degree bends in 100 lineal feet. Accessible pull boxes shall be placed every 100 lineal feet. Each conduit end shall be identified.
8. Conduit stubs from wall boxes to accessible above ceiling spaces shall be 1" minimum trade size conduit and allow for a forty percent (40%) increase in capacity. Conduit ends shall have a connector with plastic bushing installed. Reference DATA CONDUIT SIZE chart in the drawings. Pathway sizes must be calculated for the cable count and increased outside diameter of the Category 6A cable (.31" OD).
9. Conduits stubbed down walls and across or under floors to teacher island demo cabinets in science labs, art rooms, or other locations where shown on the drawings, shall be a minimum 1-1/2" conduit with no more than two (2) ninety (90) degree bends in the run.
10. All conduits shall have a 1/8" minimum pull string installed and left in place for future use.
11. All open conduit ends not installed in a conduit fitting shall have a plastic bushings installed. See Section 2.10V. Conduit identifiers shall be placed on conduit ends with waterproof labels, brass tags, or other approved identification methods.
12. MDF rooms for high schools shall be a minimum of 140 square feet of dedicated space with a minimum wall length on one side, dedicated for data use, of fourteen (14) feet and 81 square feet for elementary and middle schools with a minimum wall length on one side, dedicated for data use, of nine (9) feet. Rooms shall be

fully enclosed and have locking doors. Exterior doors shall be connected to the intrusion alarm system. MDF rooms at high schools shall have a minimum of four full height seven foot (7') data racks with 8 inch wide center and end full height vertical wire management installed. MDF rooms at elementary and middle schools shall have a minimum of two full height data racks with 8 inch wide center and end full height vertical wire management installed. Where shown, enclosed data cabinets and ventilation chimneys as manufactured by Panduit shall be installed.

13. Plywood backboards (3/4" finish grade) shall be installed on all walls in the MDF and one 4'x8' sheet at each IDF rack. Plywood shall and be painted with two coats of paint. Color shall be off-white. Fire Rated plywood shall be used where required by code or construction.
14. Ceiling or wall mounted projectors in standard classrooms, computer labs, multi-purpose rooms, libraries, or other rooms as designated shall have a 1-1/2" conduit installed from the projector location to the computer or video switching system location supporting or driving the projector. See Project Drawings and Projection System conduit plan drawings for further details. Cables may free air above accessible ceiling tiles on J-hooks. Use Garvin Industries electrical J-boxes and extension rings as specified in the drawings and in Section 2.10.W.
15. Ceiling or wall mounted projectors shall be powered by a dedicated 110 VAC quad electrical circuit.
16. Lighting across front projection screens and or walls in any room shall be separately switched from other lights in room.
17. Contractor shall install a dedicated 2" (inch) conduit from the MDF room ceiling to the roof with a weatherproof masthead installed at the roof.
18. Contractor shall install a dedicated 2" (inch) conduit from the emergency radio location, typically in the administration workroom counter outlet to the roof with a weatherproof masthead installed at the roof.

D. ELECTRICAL POWER REQUIREMENTS

Data contractor shall verify the following conditions exist prior to the start of construction. Where deficiencies exist, contractor shall bring this to the attention of the District Technology Project Manager, General Contractor, Project Manager and the Architect in writing.

1. MDF's shall include a minimum of six (6) dedicated neutral/dedicated isolated ground circuits either 120V or 240V, 20 or 30 Amp, for high schools and four (4) dedicated neutral/dedicated isolated ground circuits either 120V or 240V, 20 or 30 Amp, for elementary and middle schools as required by UPS equipment. Special plugs to accommodate rack or freestanding UPS backup systems shall be installed in the configuration and sizes as shown on MDF or IDF Elevation and Plan View drawings.
2. IDF's shall include a minimum of two dedicated neutral/dedicated isolated ground circuits either 120V or 240V as required by UPS equipment. Circuit requirements are based on the active equipment in the MDF or IDF. Verify number of circuits on drawings. Special plugs to accommodate rack or freestanding UPS backup systems shall be installed as shown on MDF or IDF Elevation and Plan View drawings.
3. All electrical outlets that provide power to computers and network equipment shall be wired as a dedicated neutral/dedicated isolated ground circuit. Shared neutrals and grounds

shall not be permitted. Each circuit shall carry no more than six computer workstations. Typically, each classroom shall have one dedicated circuit and computer labs shall have eight dedicated circuits to support the expected load.

4. Where a six-port data outlet exists in a classroom, three ISG duplex plugs meeting requirement 1.01 D3 shall be installed at this location.
5. Transient Voltage Surge Suppression (TVSS) devices, rated for the distribution panel serving the MDF, shall be installed.
6. Air conditioning and ventilation equipment shall not be powered from the same distribution panel that serves the MDF or IDF's.
7. Grounding conductors serving the TMGB or TGB located in a building shall be bonded back to the Single Point Grounding connection point at the building transformer or campus transformer. No TMGB or TGB shall be bonded directly to the ground bus in an electrical distribution cabinet.

E. TELECOMMUNICATIONS GROUNDING AND BONDING SYSTEM

1. See Section 3.04, Telecommunications Grounding and Bonding System for additional requirements. Only Grounding and Bonding components listed in this section shall be used.
2. A complete Telecommunications Equipment Grounding and Bonding System as described in 1.04.B.1, ANSI/TIA 607B Electrical Grounding of Data Communications Systems and UL 497 Grounding and Bonding for paired-conductor Communications Circuits shall be installed.
3. Refer to Telecommunications Grounding and Bonding Detail drawings for specific site details.
4. All grounding shall comply with applicable section in Articles 250, 645, 800, 810, 811 and 820 of the latest NEC, ANSI/TIA 607 and these specifications.
5. Telecommunications Grounding and Bonding system shall exhibit no more the 2 ohms potential across the ground system from the Single Point Grounding (SPG).
6. A complete and dedicated bonding conductor for telecommunications, BCT, shall be installed from the building transformer single point grounding or the campus main electrical single point grounding to each TMGB or TGB.
7. Contractor to provide one-line diagram to District Technology Project Manager showing proposed grounding system.
8. All racks, data cabinets, network equipment, UPS systems and CATV active and passive distribution equipment shall be bonded to the TMGB/TGB in each MDF or IDF.
9. All conductors used for grounding and bonding purposes shall have an overall jacket that is green in color with a BLUE tracer stripe. Jumpers used for bonding between the CNB, TMGB/TGB and Rack Grounding Strip may be green in color.
10. All cables, TMGB's TGB's and other grounding components shall be identified as a Telecommunication Equipment Ground Conductor, TMGB or TGB with manufactured tags or self-laminating, machine generated labels.

11. All ground terminations shall be secured in NEMA standard 2-hole compression lug mounts, exothermic welds, specific ground connection lugs on equipment and other connection points or as specified by the manufacturer. Nowhere shall connections be made by wrapping the conductor strand(s) around a screw head or the use of set-screw single bolt mounting lugs.
12. Bonding conductors shall be terminated with Code Conductor or Flex Conductor, Two-hole, long barrel Lugs with a minimum of 2 crimps where attaching to TMGB's, TGB's, Rack Grounding Strips or other attachment points.
13. All network grounding/bonding systems shall be inspected for full compliance by the District Technology Project Manager.

F. FIRESTOPPING

1. GENERAL

Use of hardening fire caulk systems is prohibited in conduits containing data or Audio - Visual cables.. Where penetrations require fire stop protection, installations of conduits and E-Z Path Firestop systems is required. Conduit sizes shall be coordinated to accept E-Z Path components. Contractor shall pre-plan all rated penetrations to allow the use of E-Z Path products including conduit pathways, through-wall sleeves or floor to floor sleeves.

a. SECTION INCLUDES

1. Firestopping of Through Penetrations in Fire Rated Assemblies
2. Smoke Seals
3. Construction enclosing compartmentalized areas.

b. RELATED SECTIONS

1. 03 30 00 - Cast-In Place Concrete: Sleeves and block outs in concrete assemblies.
2. 04 00 00 - Masonry Assemblies: Sleeves and block outs in masonry assemblies.
3. 07 20 00 – Building Insulation
4. 07 80 00 – Applied Fireproofing
5. 07 90 00 – Joint Sealers
6. 09 20 00 – Gypsum Board
7. 16 00 00/ 26 00 00 – Electrical: Electrical work requiring firestopping.

c. REFERENCES

1. ASTM E 814, "Fire Tests of Through Penetration Firestops".
2. ANSI/UL1479, "Fire Tests of Through Penetration Firestops".
3. ASTM E90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements".
4. ANSI/TIA-EIA-569C "Commercial Building Standard for Pathway's and Spaces".
5. Underwriters Laboratories Inc. (UL) – Fire Resistance Directory
6. National Fire Protection Association (NFPA) – NFPA 70: National Electrical Code.
7. National Fire Protection Association (NFPA) – NFPA 101: Life Safety Code.

d. PERFORMANCE REQUIREMENTS

1. The mechanical fire rated pathway device EZPath or Mini EZPath by STI shall be the preferred product and should be installed in all locations whenever possible.
2. Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.
3. Openings for cable trays shall also use the mechanical fire rated pathway EZPath unless it is not practical. When it is not practical to use the EZPath the opening shall be sealed using re-enterable firestopping pillows.

2. SUBMITTALS

- a. Submit directly to both the SRVUSD Technology Project Manager and the Facilities Dept.
- b. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.
- c. Shop Drawings: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance ratings.
- d. Certificates: Product certificates signed by firestop system manufacturer certifying material compliance with all applicable code and specified performance characteristics.
- e. Installation Instructions: Submit manufacturer's printed installation instructions.
- f. Evidence of Training: Submit copies of manufacturer's certificate of training for all installers to be involved with fire stopping.

3. QUALITY ASSURANCE

- a. Products/Systems: Provide firestopping systems that comply with the following requirements:
Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop system acceptable to authorities having jurisdiction.
- b. Firestopping products bear the classification marking of qualified testing and inspection agency.

4. INSTALLER QUALIFICATIONS

- a. The contractor must have verifiable experience in performing work of this section.

- b. All installers are to be certified by the fire stop manufacturer as having been provided the necessary training to install fire stop products in accordance with District requirements. Copies of the certificates must be provided to the SRVUSD prior to the commencement of work.

5. DELIVERY, STORAGE, AND HANDLING

Delivery: Manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instruction for multi-component products. Handle and store products according to manufacturer's recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.

6. STORAGE AND PROTECTION

- a. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

7. PROJECT CONDITIONS

- a. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- b. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- c. Maintain minimum temperature before, during, and for a minimum 3 days after installation of materials.
- d. Do not use materials that contain flammable solvents.
- e. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- f. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- g. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

8. MANUFACTURER(S)

- a. Acceptable Manufacturer:

Specified Technologies Inc.,
200 Evans Way, Somerville, NJ 08876.
Tel: (800) 992-1180 Fax: (908) 526-9623
www.stifirestop.com.

- b. Additional information can be obtained by contacting the manufacturer representative.

Joe Olson

West Cal Technologies, Inc.
925-785-6960

- c. Substitutions may be considered. ALL substitutions must be 100% equivalent to be considered. Substitutions must be approved by the SRVUSD prior to installation. Submit all substitution requests as per Section 1.5.

9. MATERIALS

- a. General: Use only firestopping products that have been tested for specific fire resistance rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.
- b. Firestop Putty: STI SpecSeal® Brand intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:
 - 1. Specified Technologies Inc. (STI) SpecSeal® Series SSP Putty
- c. Firestop Pillows: STI SpecSeal® Brand re-enterable, non-curing, mineral fiber core encapsulated on six sides with intumescent coating contained in a flame retardant poly bag, the following products are acceptable:
 - 1. Specified Technologies Inc. (STI) SpecSeal® Series SSB Pillows
- d. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
 - 1. Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway
 - 2. Specified Technologies Inc. (STI) Mini EZ-PATH™ Fire Rated Pathway

10. EXECUTION

- a. EXAMINATION
 - 1. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accordance with manufacturer's installation instructions and technical information.
- b. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellants, and any other substances that may inhibit optimum adhesion.
- c. Provide masking and temporary covering to protect adjacent surfaces.
- d. Do not proceed until unsatisfactory conditions have been corrected.

11. INSTALLATION

- a. General: Install through-penetration firestop systems in accordance with Performance Criteria and in accordance with the conditions of testing and classification as specified in the published design.

- b. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of firestopping products.
- c. Install at each firestop penetration through a wall or floor a label identifying the Manufacturer, type and size.
- d. Install on ceiling grids at wall penetration locations a label with the firestop number. EX. FS1601, Firestop, room 16, number 01.

12. FIELD QUALITY CONTROL

- a. Inspections: SRVUSD will conduct field inspections with the assistance of the fire stop manufacturer. In addition, SRVUSD may engage a qualified independent inspection agency to inspect through-penetration firestop systems.
- b. Keep areas of work accessible until inspection by authorities having jurisdiction.
- c. Where deficiencies are found, repair firestopping products so they comply with local codes and the Districts requirements.

13. ADJUSTING AND CLEANING

- a. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.
- b. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

14. APPLICABLE UL STANDARDS BY APPLICATION

Penetrant Type	Concrete Floor	Concrete Wall	Gypsum Board Wall
Blank Opening	C-AJ-0100, C-AJ-0101, C-AJ-0113, C-AJ-0116	C-AJ-0100, C-AJ-0101, C-AJ-0113, C-AJ-0116	W-L-0020, W-L-0034
Metal Conduits	C-AJ-1080, C-AJ-1240, C-AJ-1353	C-AJ-1080, W-J-1098, W-J-1100	W-L-1049, W-L-1222, W-L-1168
Plastic Conduits/ Raceways	C-AJ-2140, C-AJ-2292, F-A-2186, F-A-2210, F-A-2225	C-AJ-2038, C-AJ-2108, C-AJ-2578, C-AJ-2586, W-J-2018, W-J-2076	W-L-2059, W-L-2074, W-L-2093, W-L-2241
Cables	C-AJ-3214, C-AJ-3231, F-A-3015, F-A-3021, F-A-3054	C-AJ-3214, C-AJ-3231, W-J-3098, W-J-3099, W-J-3124, W-J-3150, W-J-3180	W-L-3219, W-L-3248, W-L-3287, W-L-3356, W-L-3377, W-L-3378, W-L-3379, W-L-3390
Cable Trays	C-AJ-3317, C-AJ-8181, C-AJ-4029, F-A-3015, F-A-3037	C-AJ-8181, W-J-4021, W-J-4022, W-J-4033, W-J-3098, W-J-3145, W-J-3158	W-L-3218, W-L-3271, W-L-3286, W-L-3306, W-L-4008, W-L-4029, W-L-4043, W-L-8073

This table is valid at time of writing. Contractor shall verify and comply with current requirements at time of construction.

G. REMOVAL OF OLD CABLES

As required by National Electrical Code, all existing low voltage cables that are to be abandoned shall be completely removed from the project. Where existing cables are to remain, used or unused, each end shall be tagged with a label that identifies its origin, pathway, destination, its purpose and type. If the cable is not rated for the installation or is insufficient in length to reach the new attachment points, the cable shall be removed.

1.02 REFERENCES AND APPLICABLE STANDARDS

The following standards are applicable to this document and must be adhered to for any installation work performed on this project.

- A. FCC Regulations Part 13 and Part 68
- B. EIA/TIA Testing Standards as published at time of installation.
- C. TIA/EIA-568-C, A.1; Commercial Building Telecommunications Cabling Standard as published at time of installation.
- D. TIA/EIA-568-C.1, 2, 3; Commercial Building Telecommunications Wiring Standards as published at time of installation.
- E. TIA/EIA-569-C, A.1-7; Commercial Building Standard for Telecommunications Pathways and Spaces, Propagation Delay and Delay Skew Specs for 100Ω 4-pair Cable as published at time of installation.
- F. TIA/EIA-606B; Administration Standard for Telecommunications Infrastructure as published at time of installation to include SRVUSD requirements.
- G. TIA/EIA-607B Electrical Grounding of data communications systems as published at time of installation.
- H. TIA/EIA-526-14B MM Fiber Testing Requirements as published at time of installation.
- I. TIA/EIA-758B, 758-1 Outside Plant Cabling Standard as published at time of installation.
- J. TIA/EIA-862 Building Automation Systems Cabling Standard as published at time of installation.
- K. TIA/EIA-J-STD-607 Earthing and Bonding Requirements for Telecommunications as published at time of installation.
- L. TIA/EIA-162-A Cabling Guidelines for Wireless Access Points as published at time of installation.
- M. TIA/EIA-TSB 72 Centralized Optical Fiber Cabling Guidelines
- N. TIA/EIA-TSB 75 Additional Horizontal Cabling Practices for Open Offices
- O. TIA/EIA- TSB 140 Field Testing of Fiber Optic Cable, Tier 2 Required
- P. BICSI Telecommunication Distribution Methods Manual, 13th Edition
- N. ISO/IEC 11801 Generic Cabling for Customer Premises
- O. Uniform Building Code (UBC)
- P. National Electrical Code (NEC Articles 250, 645, 800, 810, 811 and 820 and others as applicable)
- Q. Underwriters Laboratories Article 497 Protectors for Paired-Conductor Communications Cables
- R. Additional Requirements
 - 1. Categorized copper product shall be used in conjunction with an equivalent or higher Category UL or ETL verified cable.
 - 2. All structured cabling products shall be installed according to any applicable instructions.
 - 3. All networks and other applications shall be installed per applicable standards and manufacturers' guidelines and transmitted over the appropriate minimum Category copper cable, fiber cable or coaxial cable for which it was intended to operate on.
 - 4. All applicable local, state, national, and federal electrical and fire safety standards shall be adhered to during and after installation.

1.03 GLOSSARY

ANSI-	American National Standards Institute
BC-	Bonding Conductor
BCT-	Bonding Conductor for Telecommunications
BICSI-	Building Industry Consulting Services International
CATV-	Cable Television (broadband broadcast television distribution system)
CCTV-	Closed Circuit Television (campus-originated channels inserted into campus CATV)
CO-	Central Office
DEMARC-	End of public network and beginning of customer network point (See MPOE)
EF-	Entrance Facility
EIA-	Electronic Industries Alliance
EMI/RFI-	Electromagnetic Interference/Radio Frequency Interference
EMS-	Energy Management System
ER-	Equipment Room
FDC-	Fiber Distribution Cabinet
FOTP-	Fiber Optic Test Procedure
FTP-	Field Terminable Plug
GEC-	Grounding Electrode Conductor
GND-	Ground
HEAD END-	CATV utility's campus demarcation point
HC-	Horizontal Cross-connect
HE-	Head End
HVAC-	Heating, Ventilation and Air Conditioning
IC-	Intermediate Cross-connect
IEEE-	Institute of Electrical and Electronics Engineers
IDF-	Intermediate Distribution Frame, same as IC
IPCS-	Internet Protocol Clock Speaker
IPT-	Internet Protocol Telephone
ISO-	International Organization for Standardization
LAN-	Local Area Network
MC-	Main Cross-connect
MDF-	Main Distribution Frame, same as MC
MPOE-	Minimum Point of Entry (demark of the PSTN to the campus network)
NEC-	National Electrical Code
NEMA-	National Electrical Manufacturers Association
NVP-	Nominal Velocity of Propagation
OFCI-	Owner Furnished Contractor Installed
OLTS-	Optical Loss Test Set
OTDR-	Optical Time Domain Reflectometer
PSTN-	Public Switched Telephone Network, (EG. SBC, the phone company)
RMU-	Rack Mount Unit
SCS-	Structured Cabling System
SOP-	Signal Origination Point
SPG-	Single Point of Grounding
TBB-	Telecommunications Bonding Backbone
TBC-	Telecommunication Bonding Conductor
TEBC-	Telecommunications Equipment Bonding Conductor
TIA-	Telecommunications Industry Association
TGB-	Telecommunications Grounding Busbar
TMGB-	Telecommunications Main Grounding Busbar
TR-	Telecommunications Room
TRC-	Test Reference Cord
UPS-	Un-interruptible Power Supply
UST-	Ultra Short Throw projector
UTP-	Unshielded Twisted Pair
VoIP-	Voice over Internet Protocol
VFL-	Visual Fault Locator

WAN- Wide Area Network (multi-campus district data network)

1.04 SYSTEM DESCRIPTION

A. Provide a complete Structured Cabling System (SCS) installation to support high speed data network access for instructional and administrative purposes as specified herein and outlined on drawings. Part numbers as specified in this document are valid at the time of this specification publication. Contractor shall verify that all part numbers are current at the time of installation. Where part numbers have changed or are no longer available, contractor shall notify the District Technology Project Manager in writing of such changes, show proposed substitutions or request an alternate part number. Where a substitution is required, this shall be at no additional cost to the District.

B. The Network Systems shall include the following:

1. GROUNDING & BONDING

- a. Install a dedicated Telecommunications Main Grounding Buss (TMGB) in each building MDF or IDF connected by a dedicated #2 or larger GREEN with BLUE tracer stripe stranded copper BCT back to the main building electrical system single point grounding (SPG) which shall include any of the additional points such as an earth ground, cold water pipe and building transformer, if installed.
- b. Each additional IDF located within the same building shall have a Telecommunications Grounding Bus (TGB) installed. A dedicated #2 or larger GREEN with BLUE tracer stripe stranded copper conductor shall connect TGB's back to the TMGB.
- c. Wall mounted IDF cabinets shall have a dedicated #6 GREEN stranded conductor back to the TMGB, TGB or single point of grounding.
- d. Rack mounted grounding busbars connected to the TMGB with a dedicated #6 GREEN stranded conductor.
- e. TMGB's, TGB's and all bonding conductors shall be constructed and labeled according to ANSI/TIA 607 Electrical Grounding of Data Communications Systems herein. See Telecommunications Grounding and Bonding System Drawing for complete details or additional requirements.
- f. Telecommunications Grounding and Bonding Conductor label kits, Panduit LTYK, shall be installed on all bonding conductors adjacent to lugs, terminals or connection points.
- g. All passive and active components of the networks herein not mounted to grounded data racks, including CATV components shall be connected to the building TMGB or TGB with a minimum #12 GREEN solid copper conductors properly attached to each component per manufacturer's specifications or with lugs attached with star washers. Verify conductor size for each piece of equipment with manufacturer.
- h. Rack grounding strips and ground jumpers shall be installed on each data rack and shall have individual #6 GREEN bonding conductors installed back to the TMGB or TGB. See Grounding and Bonding detail drawings.

2. MDF RACKS, DATA CABINETS AND EQUIPMENT

- a. MDF racks- Floor mounted full height 19" data racks for mounting WAN router, FDC's, core switch, edge switches, caching proxy server, campus LAN and application servers, horizontal and vertical wire management, UPS uninterruptible power supplies and UTP patch panels as appropriate.
 - b. Racks shall be bolted to floor and braced as required for seismic restraints with cable tray installed per manufacturer's instructions.
 - c. Racks shall have a minimum rear clearance of 48 inches unless noted otherwise.
 - d. Each rack shall be set plumb and level to each adjoining rack.
 - e. Each rack shall be bonded to the CBN, TMGB or TGB. Terminal connections shall be made with paint piercing washers.
 - f. A lockable rack mount storage drawer shall be installed on the MDF rack, as shown on the MDF rack elevation drawing three (3) weeks prior to completion or start of school. Keys shall be given to the District Technology Project Manager.
 - g. Cable tray installation shall be laid out for proper attachment and placement of waterfall kits.
 - h. Where data racks are installed, Panduit PRV10 with front and rear doors shall be installed
3. IDF RACKS, DATA CABINETS AND EQUIPMENT
- a. IDF's shall be placed in a location where all cabling extending to station outlets does not exceed 90 meters.
 - b. IDF racks – Where, IDF's are located in dedicated equipment rooms, a minimum of one 19" full height data rack shall be installed. The number of racks required shall be determined by the number of classrooms being served and active equipment being installed. Racks shall have a minimum rear clearance of thirty-six (36) inches.
 - c. Racks shall be braced as required for seismic constraints with cable tray installed per manufacturer's instructions.
 - d. IDF's located in shared or confined rooms may utilize wall mounted 19" data rack(s) for mounting FDC's, edge switches, UPS's, horizontal and vertical wire management, and UTP patch panels as appropriate. Height of wall racks shall allow at least 12+ R.U.s of expansion space each after all devices and appliances herein are mounted but be no less than thirty-six (36) inches.
 - e. Wall mounted racks shall have sufficient space behind to allow install of extra deep data switches or UPS's. Depth requirements to be verified with the District Technology Project Manager or equipment specified to be installed on the rack and shall be no less than twenty-four (24) inches.
 - f. Mounting wall backboard to be cabinet grade $\frac{3}{4}$ " thick plywood painted with two coats of fire retardant paint.
 - g. Each rack shall be bonded to the CBN, TMGB or TGB. Terminal connections shall be made with paint piercing washers.

- h. Cable tray installation shall be laid out for proper attachment and placement of waterfall kits.

4. FIBER OPTIC CABLE

- a. Fiber optic cable intertie of main distribution facility (MDF) with intermediate distribution facilities (IDF's) in a star configuration. Each single mode backbone fiber optic cable run from MDF to IDF shall be a direct continuous run without kinks, splices or outer jacket break or tear. All cable products, conduits, and passive equipment shall be rated for the environment they are installed in.
- b. All new fiber optic cable shall be MPO type pre-terminated with applicable MPO cassettes and FDC's.
- c. Fiber optic cable terminations in rack mounted Fiber Distribution Cabinets (FDC's) at MDF and IDF's. FDC's shall have appropriate fiber optic connector panels or cassettes to match fiber counts. Use high-density dual 'LC' fiber optic connectors, 12 per mounting panel (supporting 12 fiber optic strands per panel) depending on fiber type installed. Blank panels shall be installed in unused FDC slots where no fiber optic cables are terminated. FDC's shall have adequate room to safely accommodate patch cords. All cable products, conduits, and passive equipment shall be rated for the environment they are installed in. Fibers shall be correctly terminated with fiber fan out kits and secured within the cabinet to prevent damage to the fibers when a tray is opened or closed.
- d. Fiber optic cable protection – Cable shall be protected by innerduct anywhere it is exposed outside of conduit except where the cable exits innerduct for a service-loop. In all areas behind the data rack or cabinet, it shall run in innerduct for protection. In underground pull boxes, fiber cable shall run in innerduct where it loops out of one conduit and enters the next. In above ceiling areas, fiber cable shall be run in innerduct where it is not in conduit. All cable products, conduits, and passive equipment shall be rated for the environment they are installed in. Innerduct shall have "Caution, Fiber Optic Cable" tags installed.

5. CATEGORY 6A CABLE

- a. Standard classrooms shall typically be equipped with twelve (12) Category 6A data jacks as shown on drawings. Typically, a Type "H" multimedia faceplate with three ports, a Type "B" two port faceplate, a Type "E" six-port faceplate, and one Type "I" faceplate at the projector location or where shown. The Type "H" located at or near the teacher desk location shall be the starting point of the jack numbering (EX. 101-01/02/03). The Type "B" shall be numbers 04 and 05. The Type "E" six port faceplate shall be numbers 06 to 11 and the Type "I" YELLOW single port number 12. See Faceplate Port Configuration Types for port types or as noted on drawings. See Typical Classroom Patch Panel Layout Drawing for numbering scheme.
- b. Each room or locations shown shall also include a Type "J" data jack at the IP Clock Speaker location and a Type "K" for wireless access point connection.
- c. 24-port, 19" rack mountable, all metal angle or flat, Category 6A patch panels utilizing modular snap-in, 8 position/8 conductor data jacks for interfacing with switches and station cable terminations. Racks shall use a 24 port angled front patch panel. Wall mounted cabinets shall use 24- port flat front patch panels.

- d. Install one CPATCBL angled patch panel cover on the top and bottom of each angled patch panel stack.
- e. All data cables shall be protected from being painted in this project. Cables that are painted loose warranty coverage and shall be replaced at no cost to the District.

6. TELEPHONE TWISTED PAIR BACKBONE

- a. Installation of one or more 25 pair Category 5e cable(s) from the campus MPOE to the campus MDF. This cable exists to extend the PSTN analog phone dial tone from the PSTN entry point of the campus to the data rack housing the router and the UTP cabling infrastructure supporting the analog line requirements of the campus including alarm, elevator or other support systems. Cable(s) shall be wet rated where applicable. See Analog Telephone Wiring Plan for routing, quantity, and termination locations.
- b. Installation of one or more 6/12 or 25 pair Category 5e cable(s) from the campus MDF to each IDF. This cable exists to support dedicated analog phone dial tone requirements for alarm, elevator or other support systems. Cable(s) shall be wet rated where installed underground. See Analog Telephone Wiring Plan for details.
- c. Installation of one 25 pair Category 5e cable from the campus MPOE/MDF to the MPR and/or GYM IDF. See Analog Telephone Wiring Plan for details.
- d. Installation of a Voice Patch Panel, VP24382TV25Y on the MDF rack where specified and connection back to the RJ21X block on the Telco Blue Board using a RJ21X to RJ21X connector cord.
- e. At the MPOE/MDF, required Blue Boards shall be mounted for termination of all incoming multi-pair cables. Blue Board(s) shall be mounted adjacent to the PSTN 1.1 (MPOE) or RJ-21X termination field. White mushroom board(s) shall be mounted on top. See Analog Phone Wiring and Distribution Plan.
- f. Incoming multi-pair cables from IDF's shall be terminated on Circa PROTECTION BLOCKS and then cross-connected to 25 pair 66 blocks. Each 66 block may be fully terminated on each side. 66 blocks shall be labeled to show room or building being serviced. See Analog Phone Wiring and Distribution Plan.
- g. Cable(s) shall be identified at all ends as specified herein, indicating origin/destination.
- h. Cables installed in underground conduits shall be wet-rated, gel-filled polyethylene jacketed.

7. CATV SYSTEM

Provide a complete campus CATV distribution system to each IDF or other locations as shown or specified in the drawings. See CATV System Single Line Diagram and Connection Details for project specifics. System shall include the following:

- a. Coaxial cable intertie of 'head end' (located at MDF) with individual building distribution points located in IDF's in a star configuration. Each backbone coaxial cable run from MDF to IDF shall be a direct continuous cable run

without kinks, splices or outer jacket break or tears. All cable products, conduits, and passive equipment shall be rated for the environment they are installed in.

- b. Conduits supporting 625 "hardline" shall be a minimum three inch (3") diameter conduit with thirty-six inch (36") bend radius.
- c. Coaxial cables between buildings and within buildings shall be bonded to the TMGB/TGB in each building.
- d. Conduits installed for coaxial cable installations shall be run in a star fashion from the MDF or IDF to each station.

8. IP CLOCK-SPEAKER AND SPEAKER PAGING SYSTEM

- a. Install one Cat 6A data cable to each IP based clock-speaker for distribution of voice announcements and passing or warning bell tones. Backboxes and speakers shall be OFCI
- b. Each classroom shall have an IP clock-speaker with talkback capability. Each speaker shall be fed by a Panduit TX6A 10GIG Cat 6A cable terminated with a CJ6X88TGV L jack at the patch panel and a FP6X88MTG FTP at the Clock-Speaker backbox. Backboxes and speakers shall be OFCI.
- c. Each non-classroom space shall have an IP clock-speaker with talkback capability. Each speaker shall be fed by a Panduit TX6A 10GIG Cat 6A cable terminated with a CJ6X88TGV L jack at the patch panel and a FP6X88MTG FTP at the Clock-Speaker backbox. Backboxes and speakers shall be OFCI.
- d. Where interior corridors have an IP Clock-speaker installed, each speaker location shall be fed by a Panduit TX6A 10GIG Cat 6A cable terminated with a CJ6X88TGV L jack at the patch panel and a FP6X88MTG FTP at the Clock-Speaker backbox. Backboxes and speakers shall be OFCI.
- f. Building exteriors, interior corridors or other common areas shall have a 70 Volt zone speaker installed at locations shown. Each speaker shall be connected back to the MDF or IDF with a Belden 5200UE 16/2 cable in a star topology. A 16/2 speaker lead shall be installed from the speaker terminal strip on the wall to the amplifier location shown on the rack elevation. Unless specified, speaker taps shall be set to 70 volt- 2 watts. Where speakers have a transformer, un-used leads shall be individually capped and secured off.

9. IP SECURITY CAMERAS AND INFRARED ILLUMINATORS

- a. At all exterior security camera locations shown, install two (2) Panduit TX6A 10GIG Cat 6A cables terminated with CJ6X88TGGD jacks at the patch panel and FP6X88MTG FTP's at the Security Camera location.
- b. At all interior security camera locations shown, install one (1) Panduit TX6A 10GIG Cat 6A cable terminated with a CJ6X88TGGD jack at the patch panel and FP6X88MTG FTP at the Security Camera location.
- c. Security camera backboxes used in interior and exterior locations are OFCI. Where no backbox is required, coiled the cable and leave in the ceiling at the camera location

1.05 SUBMITTALS AND SUBSTITUTIONS

- A. In addition to requirements under the Contract General Conditions, within thirty-five (35) calendar days after the date of award of the contract, the contractor shall submit to the District Technology Project Manager for review and approval, five (5) copies of the complete 27 00 00 submission. The submission shall be arranged in eight (8) major sections, with each section separated by index tabs, in the below stated order. Each section page within each section shall be numbered in chronological order. The District will keep two (2) copies for its records.

1. **SECTION 1-** Index

This Section shall include the Project Name and address, Contractor Name and address, contact information with phone, cell, pager and fax numbers.

2. **SECTION 2-** Compliance Statements

The following statements must be copied word for word and included in the submittal package. Submittals will be rejected if these statements are missing.

A. A signed and dated statement that states,

"I, (name) of (XYZ Company) have fully read and understand all provisions of these plans and specifications. All work will be installed according to the plans and specifications and I understand the penalties that might be imposed for equipment cleaning, re-inspections, repairs by the District, or other costs associated for failure to comply with this Document".

I declare under penalty of perjury and the laws of the State of California that the foregoing is true and correct, executed this _____ day of _____, 20__ in _____, California.

B. Contractor shall submit the following California Department of Justice background clearance check statement.

I, (name) of (XYZ Company), declare as follows:

1. I/We conducted criminal background checks through the California Department of Justice by submitting fingerprint cards to the Department Of Justice for each employee assigned to work for the District pursuant to our Contract to provide specified services to the District.

2. No employee assigned to perform services for the District pursuant to our Contract have been convicted of serious or violent felonies as defined by Penal Code Section 1192.7(c) and 667.5(c).

3. No employee who has a record of conviction for a serious or violent felony will ever be assigned to perform services, under any existing or future contract with the District if the contract requires employees to come in contact with pupils.

4. I am the dully authorized representative for (Company) for the purpose of providing this certification. Only employees with completed criminal background checks will be assigned to perform service for the District. The employees currently assigned to perform services for the District pursuant to our contract are set forth on Exhibit "A" attached hereto.

I declare under penalty of perjury and the laws of the State of California that the foregoing is true and correct, executed this _____ day of _____, 20__ in _____, California.

LIST OF FINGERPRINTED EMPLOYEES ASSIGNED TO WORK FOR THE DISTRICT

(Attach List)

Signature: _____

Printed Name: _____

Title: _____

3. **SECTION 3-** Bill of Materials (BOM)

A complete BOM clearly listing all **quantities** of all products by type, color, cable footage by type and other information on products to be used. Contractor shall guarantee that all systems will function as specified in this document. District shall be the sole judge as to the equality of submitted materials. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application. Include all Firestop product material cut sheets and quantities used.

4. **SECTION 4-** SUBSTITUTIONS

Contractor shall use all specified components in this document. Where substitute products are used, contractor shall insert all submittal sheets in a separate section clearly marked as "SUBSTITUTIONS". Include all quantities and information as stated in SECTION 2. Submit product samples for District review and testing, compatibility and interoperability with existing District systems, detailed calculations, detailed one-line drawings, equivalent warranty and data/catalog cuts sheets listing all physical and electrical characteristics and ratings indicating compliance with all listed standards for each product and component being substituted herein. Any substitution must equal or exceed that of any components specified or used by the District. District shall approve all substitutions prior to installation.

5. **SECTION 5-** CONTRACTOR AND INSTALLER CERTIFICATIONS

- A. Submit proof of Panduit Contractor Certification.
- B. Submit a valid copy of the contractors California Contractor License.
- C. Submit valid and current Panduit Certified Installer Certificates of Completion for **each** technician to be employed on this Project at the time of installation. If new installers are brought on the job, proof of experience shall be provided to the District Technology Project Manager prior to their arrival on the project.

6. **SECTION 6-** TEST EQUIPMENT AND TECHNICIAN TRAINING

- A. Submit valid and current Certificates of Calibration for Test Equipment to be utilized. Test reports submitted with out of date calibration or software/firmware updates will not be accepted.
- B. Certificates of Training or Certification for **each** technician who will conduct testing on the Project shall be submitted.

7. **SECTION 7-** DIAGRAMS AND DESCRIPTIONS

Describe system operation, equipment, dimensions, and indicate features of each component. Include Riser or single line diagrams indicating all components, including grounding, of the system with required cable intertie and backbone cable identification labels. Furnish structural calculations for equipment anchorage as required.

8. **SECTION 8- WARRANTY**

- A. Furnish sample of Panduit 30 Year Warranty information. Provide all other warranty information.
- B. Furnish sample of Panduit Fiber Optic Warranty information.
- C. Sample of contractors product and completed installation warranty.
- B. The District shall return to the contractor within fifteen (15) working days upon receipt of the submittal from the architect, three copies of the submittal with comments and markups.
- C. Contractor shall not proceed with this installation until signed written approval of all submittals has been received from the District Technology Project Manager.
- D. No substitutions shall be permitted without prior written approval from the District. For approval, supporting documentation must be submitted.

1.06 **QUALITY ASSURANCE**

- A. Company and Installer's qualifications. These conditions must be met prior to commencing work on this project.
 - 1. Installer(s) must have a minimum of 5 years' experience in satisfactory completion of high-speed data, phone and CATV network projects similar in scope and cost. Provide backup information on such projects.
 - 2. Provide satisfactory evidence of financial strength.
 - 3. Each installer on the project must have, prior to commencement of work, a valid and current Panduit Certified Installer (PCI) Certificate of Completion. (Certificates are valid for Two Years) If the technician does not have a valid certificate, the individual shall not install any portion of the work where the certificate is required
 - 4. Installer shall possess a C-7 Low Voltage license or other California Contractor's license qualifying Installer to perform the work.

1.07 **PROJECT MANAGEMENT**

- A. Contractor warrants that all contracted work shall be managed, to the District's satisfaction, by a qualified and designated project manager at the system installation site, who shall:
- B. Attend all scheduled (e.g., weekly) project status meetings (including responsibility for generating and distributing meeting minutes).
- C. Be available to the District Technology Project Manager at all reasonable times.
- D. Be responsive to the District's questions, problems and/or concerns.
- E. Be on-site at scheduled times to inspect work progress.

- F. Be on-site during critical phases of work.
- G. The designated project manager for the system installation, whose name and phone numbers (office, home and pager) shall be provided to the District Technology Project Manager prior to initiation of any on-site work under any contractual Agreement, shall:
 - 1. Be the single-point-of-contact to the District Technology Project Manager for that system site.
 - 2. Have overall responsibility for all contracted work until total Project Acceptance.
 - 3. Have the authority to make necessary decisions and enlist necessary resources to ensure successful completion of all contracted work in the required timeframes.

1.08 CONTRACTOR PERSONNEL

The District reserves the right to accept or not accept the Contractor's proposed Project Manager, lead technician, and/or system designer. The District must approve any change in Contractor's selected and approved project team members, in advance and in writing. This is to assure that the Contractor does not arbitrarily remove persons with vital experience and skill from the project. Contractor personnel changes not approved by the District may be cause for the District to terminate the contract.

1.09 CONDUCT AND IDENTIFICATION

- A. All Contractor personnel shall wear visible identification badges at all times on active campuses.
- B. Contractor shall not perform work in a manner, which unreasonably impedes the District's conduct of its business. Smoking, use of profanity, discussion of arrest or criminal records or drinking will not be allowed in or on District and school buildings and campuses, SPECIFICALLY INCLUDING THE EQUIPMENT ROOMS AND TELECOMMUNICATIONS CLOSETS, other than those specifically designated by the District for these activities. The SRVUSD has a "Zero" tolerance policy for smoking, drug and /or alcohol on District property. Under no circumstances will this be allowed on District property at any time.
- C. When working, testing, modifying or repairing work in active classrooms or other spaces, the contractor shall check in at the school office and shall also notify the District's Technology Project Manager by calling 925-824-1817. See Section 4.01 U, V, and W for additional conditions.

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Data cabling system components and cable shall not be delivered to the site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipping shall be replaced and returned to manufacturer at no cost to District.
- B. Storage: Store in clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handling: Handle in accordance with manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to manufacturer.

- D. Electronic Components: Electronic components shall not be delivered until time of installation. Installation time shall be coordinated with the District Technology Project Manager and shall be no less than three weeks prior to the start of school.
- E. MDF/IDF clean-up: All MDF/IDF rooms shall be fully cleaned prior to turn over to the District. Where the Project is completed in phases, the general contractor shall maintain all operational MDF and IDF equipment rooms for the life of the Project in a clean and dust-free condition. Temporary dust covers, door seals and other protective measures shall be employed to maintain this condition. Plastic or fabric drop sheets draped over active equipment shall not be permitted due to ventilation requirements. If this condition is not maintained and after 24 hour written notice to correct, contractor shall reimburse the District for its cost to clean and service all active equipment including any Air Conditioning equipment installed for the MDF/IDF.

1.11 WARRANTY

- A. Prior to acceptance of the Project or Project Phase by the District Technology Project Manager, Contractor shall provide copies of manufacturer warranty documents showing manufacturer acceptance and warranty issued to District.

- B. CATEGORY 6A WARRANTY

- 1. Contractor shall provide a Thirty (30) year product and Thirty (30) year application warranty as offered by Panduit for all installations herein commencing upon acceptance by District. Product warranty requires compliance with TIA Standards for conductor untwists, bend radius and other installation requirements.
 - 2. The following additional warranty items shall be submitted with the Panduit System Category 6A warranty documents.
 - a. Product warranty, as offered by Panduit, shall be provided on the installed TX6A 10GIG Cat 6A cable.
 - b. Application 30 Year Headroom Warranty, as provided by Panduit shall be offered. This warranty requires project pre-registration by Contractor.
 - 3. All Panduit warranty and project registration questions can be addressed to:

Tim Lewis, Network Specialist
Ewing-Foley, Inc.-East Bay Representative
Office 408-342-2409
Cell 925-337-2818

- C. FIBER OPTIC CABLING WARRANTY

- 1. Fiber optic cable performance warranty as offered by Panduit where Panduit fiber and connection components are used.
All Panduit warranty and project registration questions can be addressed to:

Tim Lewis, Network Specialist
Ewing-Foley, Inc.-East Bay Representative
Office 408-342-2409
Cell 925-337-2818

- D. INSTALLATION WARRANTY

- 1. Contractor shall warrant all installed work for a period of one year from the date of acceptance by the District.

1.12 MAINTENANCE

Maintenance services shall be provided for a period of one (1) year from the date of acceptance by the District.

- A. Distributor of the major system components shall maintain a replacement parts department and provide testing equipment when needed. A complete parts department shall be located close enough to the San Ramon area to supply replacement parts within a 4 hour period.
- B. Service must be rendered within 4 hours of system failure notification during any applicable warranty period.

1.13 STANDARDS FOR EQUIPMENT AND HARDWARE

All purchased equipment and materials shall be new. All purchased equipment and materials shall be the latest versions available of all hardware and shall conform to the highest current applicable telecommunications industry standards. Defective or damaged equipment and materials shall be replaced or repaired, prior to Systems Start-up or Cutover, in a manner, which meets the approval of the District Technology Project Manager and at no additional cost to the District.

1.14 ADDITIONAL WORK

During the course of performing the Work, Contractor may be required to perform additional work within the general scope of the contract. At such time when additional work is required, the District shall forward to Contractor, through the Architect, a description of the work to be accomplished and request that a proposal be offered within a given time period. No additional work shall commence by Contractor without a valid District contract or purchase order, amendment of the original contract or purchase order, or written authorization from the District's Technology Project Manager.

1.15 OWNERSHIP OF DOCUMENTS

All submitted paper or electronic versions of designs, drawings, specifications, notes and other work developed in the performance of any contract resulting from this Contract are the sole property of the District and may be used by the District for any purpose, now or in the future, without additional compensation to the Contractor.

1.16 LIFE OF THIS SPECIFICATION

This Specification is a living document. The criteria contained in this Specification are subject to revisions and updating as warranted by advances in building construction techniques and telecommunications technology. At the time of installation, contractor shall install the latest version of the part numbers specified herein. Where part numbers have changed, contractor shall submit to the District product cut sheets showing the replacement equivalent for approval. Changes which are only of product type shall be permitted, at no charge, under this contract.

End of Section 1

SECTION 2 – PRODUCTS AND SPECIFICATIONS

2.01 MANUFACTURERS

- A. Products equal or better than those by the following manufacturers will be considered providing that all features of the specific product named herein are provided. District Technology Project Manager shall be the sole arbiter of equality of products. See Section 2.10A-Y for specific manufacturer parts approved for use on District projects.
 - 1. Cisco- No Substitute
 - 2. Panduit- No Substitute

3. Atlas IED- IP Clock speakers, zone speaker and AV speakers- No Substitute
 4. SP Controls- Pixie Plus, Pixie Pro- No Substitute
 5. STI- Fire Stop Products- No Substitute
 6. IMI Data Products- Wall Mount Data Cabinets- No Substitute
 7. Chief Manufacturing- Projector or Interactive Whiteboard mounting products- No Substitute
 8. Garvin Industries- Oversized junction boxes and mud rings
 9. General Cable- other cable types
 10. Belden- AV Cables
 11. Commscope Cabling- Coaxial cabling
 12. Comprehensive Video- video and audio cabling products
 13. Cables 2 Go, C2G- video and audio cabling products
 14. Kramer Cables- video and audio cabling products
 15. Covid Cabling- video and audio cabling products
 16. Thomas and Betts/LRC- Coaxial connectors
 17. Chatsworth- Racks, cable tray, mounting products
 18. Middle Atlantic Products- AV Cabinets
 19. Hoffman
 20. Carlon Inner Duct Products
 21. Erico/Caddy- J Hooks, supports, adapters,
 22. Crestron
 23. Hitachi
 24. WBT- Wire Basket Tray
- B. SUBSTITUTIONS: No substitutions are allowed for Panduit data, Cisco Systems, Inc., Chief Manufacturing, Atlas Sound and STI E-Z Path (or otherwise as approved by District Technology Project Manager).
- C. UNIFORMITY OF CABLING: Contractor shall provide and install cabling for each application of only one model and manufacture. For example, Category 6A data cabling shall be the same identical product from the same manufacturer's batch. The same shall be true of all of cables by type.
- D. COMPONENTS: Components, jacks and terminations shall be of the same manufacturer at both cable ends and for the entire project.
- E. All data and AV cabling installed shall be the shortest length possible as required to meet the installation and service loop requirements.

2.02 GENERAL

- A. All material used shall present no environmental or toxicological hazards as defined by current industry standards and comply with OSHA and EPA standards, other applicable federal, state, and local laws.
- B. Passive fiber optic physical equipment and apparatus used in interconnecting and cross-connecting fiber optic cables shall possess a minimum fire resistant rating of UL94V-1.
- C. The equipment, apparatus, and material for fiber optic equipment and apparatus shall conform to existing OSHA Health and Safety Laws. The equipment and apparatus shall have provision for the application of safety labels such as laser identification or warning labels as required by system considerations.
- D. The fiber optic cable shall be required to exhibit stable performance in a building and underground conduit environment. The optical transmission performance of the fiber shall not be significantly affected by environmental fluctuations, installation, or aging.

- E. All components used for data connectivity with the system, and the completed installation, must be tested for data rates up to and including ten (10Gb) gigabit per second for UTP cabling and ten (10Gb) gigabit per second for fiber optic cabling.
- F. Category 6A Permanent Link cables shall be a **minimum length of sixty-three (63) feet / eighteen (18) meters** and no longer than 297 feet / 90 meters electrically. Physical distance shall not be used in this calculation. See manufacturer's specifications for appropriate tables equating electrical length with physical length. This value is approximately 10 percent (10%).
- G. Cables shall be installed such that maximum distances will be maintained from sources of EMI/ERI. No cables shall be run adjacent to high voltage (110v or greater) power cables in any location. Where required, intersections of low voltage cables and high voltage conduits and fixtures shall be as close to 90 degrees (perpendicular) as possible.

2.03 DATA EQUIPMENT RACKS AND CABINETS

Refer to MDF /IDF data and cable tray plan views and elevations for specific layouts.
Light gauge sheet metal rack assemblies will not be accepted.

A. MDF ROOMS

- 1. See MDF rack plan view and elevation layout drawings for site specific details.
- 2. Data racks shall be installed per the following schedule.
 - a. High Schools- High school MDF's shall have a minimum of four full height data racks with full height eight inch wide vertical wire management units with front and rear doors installed on each end and all centers. See other requirements for size, spacing and placement elsewhere in this specification.
 - b. Elementary and Middle Schools- Elementary and middle school MDF's shall have a minimum of two full height data racks with full height eight inch wide vertical wire management units with front and rear doors installed on each end and center. See other requirements for size, spacing and placement elsewhere in this specification
- 3. Racks shall be bolted to floor and attached to wall with cable trays as required for seismic bracing. Where more than one rack exists, racks shall be set plumb and level to each other.
- 4. See MDF Rack plan view for cable tray design and placement.
- 5. Racks shall have subtle light-blue RMU markings on uprights, (front and back), UL listing, clean-thread screws, black hardware (with black racks) and textured paint.
- 6. Racks shall be constructed of 6061-T6 extruded aluminum and have a minimum flange thickness of 0.25" (6.35mm) and a minimum web thickness of 0.17" (4.32mm). Mounting holes shall be 12-24 thread spaced 5/8"- 5/8"- 1/2" alternating hole pattern.
- 7. Provide one (1) bag, quantity 50, rack mounting screws for each rack installed.

B. IDF ROOMS IN DEDICATED SPACE

- 1. See IDF rack and elevation layout drawings for specific placement of components.
- 2. Data racks shall be installed per the following schedule.

- a. High Schools- High school IDF's shall have a minimum of one full height data rack with full height eight inch wide vertical wire management units with front and rear doors installed on each side. See other requirements for size, spacing and placement elsewhere in this specification.
 - b. Elementary and Middle Schools- Elementary and middle school IDF's shall have a minimum of one full height data rack with full height eight inch wide vertical wire management units with front and rear doors installed on each side. Where rack size permits, a three (3') foot wall may be used. Refer to rack elevations for additional detail. See other requirements for size, spacing and placement elsewhere in this specification.
 - c. Refer to drawings for specific rack count
3. Racks shall be bolted to floor and attached to wall at top with cable trays as required for seismic bracing.
 4. See IDF Rack plan view for cable tray design and placement.
 5. Racks shall have subtle light-blue RMU markings on uprights (front and back), UL listing, clean-thread screws, black hardware (with black racks) and textured paint.
 6. Racks shall be constructed of 6061-T6 extruded aluminum and have a minimum flange thickness of 0.25" (6.35mm) and a minimum web thickness of 0.17" (4.32mm). Mounting holes shall be 12-24 thread spaced 5/8" – 5/8" - 1/2" alternating hole pattern
 7. Provide one (1) bag, quantity 50, rack mounting screws for each rack installed or cabinet.

C. IDF's IN CLASSROOMS

In-room IDF's shall be avoided if at all possible. If required, each in-room IDF shall have one or more wall mounted Innovative Metal Industries (IMI) cabinets installed. Innovative Metal Industries cabinets are a District standard. Panduit High-density modular patch panels may be utilized. Cabinets shall have adequate conduit stubbed up above ceiling line for installation of station cables plus twenty-five percent (25%) growth. IMI cabinets shall be served by a dedicated neutral/dedicated isolated ground circuit and be bonded back to the building TMGB, TGB or single point of grounding with a separate TBC. Cabinet door shall be directionally hinged for the area being installed in. Refer MDF/ IDF Elevations for cabinet elevations.

D. IDF's IN CONFINED SPACES

Where IDF's are located in confined spaces, a wall mounted rack or Innovative Metal Industries (IMI) cabinet for mounting fiber distribution cabinets, switches, UTP patch panels, and wire management fixtures may be utilized. Size will be determined as appropriate for each IDF application. IDF wall racks will have expansion capacity to accommodate twelve rack units (12 U's) worth of electronic and other components. Rack mounting face to be a minimum of 24" from the back wall. Racks or IMI cabinets shall be served by a dedicated isolated ground/dedicated neutral circuit and be bonded back to the building TMGB, TGB or single point of grounding with a separate TBC.

E. WALL MOUNTED DATA CABINETS

1. Standard wall mount cabinets must be of sufficient depth to allow for the installation of 20 inch (20") deep UPS units plus allow for a front clearance of six inches (6") between door and equipment face.). Mounting holes shall be 12-24 thread spaced 5/8" – 5/8" - 1/2"

alternating hole pattern. Cabinets shall be as manufactured by Innovative Metal Industries (IMI). Retain included mounting screws and turn over to the District.

2. Equipment rails shall be adjustable for front depth requirements
3. All cabinet sections shall be key lockable for security
4. Cabinets shall be rated for up to 200 pounds weight.
5. Cabinets intended for use on the Project must be approved in writing by the District Technology Project Manager prior to installation.
6. Cabinets shall be grounded to the TMGB, TGB or single point of grounding per ANSI/TIA 607, have seismic bracing installed and adequate lighting for the installed environment.
7. Cabinet shall be secured to the wall studs at two points horizontally and two points vertically with 3/8" lag bolts of a length sufficient to achieve three (3") into solid material.
8. Rack rail mounting screws shall remain with the cabinet.
9. Retain blanking covers, plates or other cabinet hardware.

F. CABLE TRAYS

1. All cable or wire basket trays shall be installed according to MDF or IDF elevation or plan views.
2. Required connectors, butt-splices, junction-splice, j-hooks and other attachment fittings shall be used to complete the assembly.
3. Where triangular support brackets are used, the diagonal bar shall be wrapped with closed cell foam pipe insulation.
4. Protective end caps shall be installed on all exposed cable tray ends.
5. Wall angles shall be attached to 1½" uni-strut bars that have been securely bolted to the wall framing with lag bolts with minimum 3' embedment into the wood framing member. See attachment detail drawing.
6. Where vertical all-thread rods are used to support ladder sections, a protective covering shall be installed over the all-thread rod.
7. Contractor shall install cable or wire basket trays to allow for proper installation of waterfall wire management kits into vertical wire management.
8. Cable and wire basket trays shall bond to the TMGB, TGB or CBN. See Telecommunications Grounding and Bonding detail diagrams.
9. All cable or wire basket tray sections shall be bonded to each other using the listed bonding kit. See MDF or IDF plan view drawings.

G. WALL/FLOOR MOUNTED AUDIO VISUAL CABINETS

1. Wall/Floor mounted A/V cabinets shall be adjustable for left/right box swing.
2. Cabinets shall have locking doors with adjustable left/right swing.

3. Cabinet shall have a rear backpan 12"x12" laser cutout allowing cabinet to sit over wall mounted 12"x12" J-box.
4. Cabinet shall have a black finish.

2.04 GROUNDING

- A. The grounding system shall consist of the following minimum components.
 1. See Telecommunication Grounding System Single Line Diagram and Grounding and Bonding System Details for specific requirements.
 2. TMGB bonded back to the main single point grounding for the building or campus with a #2 GREEN stranded conductor with BLUE tracer stripe.
 3. TGB's in each building shall be bonded to the TMGB with a #2 GREEN stranded conductor with BLUE tracer stripe.
 4. Installation of a Common Bonding Network conductor (CBN) from the TMGB/TGB to serve all grounding points. The CBN can be eliminated where only several connections are to be made to the TMGB or TGB.
 5. Each data rack shall have a Rack Grounding Strip installed as shown in the Telecommunications Grounding and Bonding detail drawings.
 6. Each rack assembly shall be individually bonded to the TMGB, TGB or CBN with a #6 GREEN stranded conductor. Daisy chaining of a single bonding conductor between racks is not permitted.
 7. All cable tray sections shall be bonded to each other with the specified jumper.
 8. Cable trays shall be bonded to the TMGB or TGB with a #6 GREEN stranded conductor.
 9. All CATV active and passive equipment shall be bonded to the TMGB or TGB with a #12 GREEN stranded conductor.
 10. All inter-building copper communication cables shall be bonded to the TMGB or TGB at each end using the manufacturer's recommended cable connector or procedure.
 11. Ground protection blocks shall be installed where required by National Electrical Code or application.
 12. All grounding and bonding conductors shall be terminated with NEMA two-hole, long barrel compression lugs.
 13. Paint piercing washers shall be used between all cable lugs or grounding hardware and coated or painted surfaces.
 14. All grounding and bonding metal-to-metal connections shall be coated with an anti-oxidizing compound.

2.05 CABLE MANAGEMENT

- A. HORIZONTAL CABLE MANAGEMENT: Provide Category 6A horizontal inter-bay patch cord/cable organizers as shown on the elevation drawings. 19" rack mounted, two-unit high for

routing cables on both the front and rear of each equipment rack. Fingers shall have radius bend control built in. Furnish organizers between fiber optic patch panels and Ethernet switch(s). Horizontal- Panduit 2U- NM2 or 2U- NMF2. Install NM2B blank fillers in all NM2 or NMF2 wire manager openings. See MDF and IDF Rack elevations for type, quantities and locations.

- B. VERTICAL CABLE MANAGEMENT: Provide Category 6A vertical jumper management organizers mounted to rack, on both sides of frame, running full height. Vertical management shall have radius bend control fingers on each side. Vertical- Panduit PRV8 or PRV10 with front and rear PRD8/PRD10 doors shall be used on full height racks. Vertical- Panduit WMPV22E shall be used on wall racks only. See MDF and IDF Rack elevations for types, quantities and locations.
- C. "D" RING: Install one row of 6" high "D" rings, spaced 2' - 0" on center, along communication wall or from PSTN 1.1 demarc to MDF racks. Mount rings at top of plywood backboards.
- D. INNERDUCT: Provide minimum 3/4" innerduct for installation of each fiber optic cable. Innerduct shall be corrugated type, colored orange and labeled: "Caution Fiber Optic Cables."
- E. J-HOOKS: Where cables are installed "free air" above ceilings, wide Base (2" radius) Category 6A cable support type J-hooks shall be used. Standard square edge conduit/pipe type J-hooks will not be accepted. Hooks shall be sized for the corresponding number cables to be installed. Hooks shall be spaced on 4' - 0" centers max and installed with the manufacturers approved connection devices based on attachment method required. Cables shall be installed in maximum bundles of twelve (12) Cat 6A cables. No more than 4 bundles shall be installed in a J-Hook.
- F. In all cable management, cables shall be loosely bundled and secured with Panduit Tak-Tape type cable ties. Ratcheting ties shall not be used.
- G. Category 6A cables shall be installed such that the cables landing on the front left side of the angled patch panel enter from the left rear and sweep to the right rear side. The opposite applies to cables landing on the right front side. Cables shall be routed through the management fingers in groups of no more than 12 cables at the same elevation as the patch panel they are landing on.

2.06 FIBER OPTIC CABLE AND HARDWARE

A. OUTSIDE PLANT CABLE

- 1. Provide 12 strand pre-terminated Panduit MTP single mode fiber optic outside plant cable, loose tube construction as called out in the Data Cable Schedule. Outer sheath shall be constructed of high-density polyethylene. Where fiber cabling is for temporary housing, contractor shall retain all connector caps, pulling sleeves and reels for turnover to the District.
- 2. Where pre-terminated fiber is not specified, contractor shall provide, install and terminate single mode or multimode fiber as specified in the project Data Cable Schedule.
- 3. Fiber optic cable breakout (fanout) kits are required for all fiber optic cable terminations in fiber distribution cabinets where splice-on connectors are to be used. Such kits to be made by same manufacturer as the fiber optic cable and to match the number of strands in the cable assembly. Break out kits to be securely mounted to FDC mounting points per FDC manufacturer's instructions. Each fiber cable shall be securely mounted to the FDC per manufacturer's instructions. No more than one half inch (1/4") of exposed buffer tube shall exist between the cable jacket and the fanout connector body. Apply tape from the end of the fiber cable jacket to and over the end of the fanout kit body.
- 4. Fiber terminations shall be fusion spliced, installed in protective fiber optic splice modules (FOSM) and then installed in the specified FMT1, FRME1U, FRME2U or FCE4U enclosure.

5. Where specified, Panduit LC Splice Cassettes shall be used. These cassettes can also be installed in the FLEX-** cassettes trays.
6. When fibers are spliced, each splice shall be protected by a heat shrink splice tube.
7. The fiber optic cable shall have a rated tensile load of 600 lbs. maximum.
8. Supply a 20' service loop of fiber cable secured to the backboard using Leviton 48900-IFR management rings at each end of the fiber optic cable.
9. Provide Carlon or equivalent innerduct to protect fiber optic cable exiting conduits in data closets, pull boxes, ground boxes or other locations where it is outside of rigid conduit.
10. Fiber strands within each sheath shall be color coded to allow identification of each fiber.
11. All existing fiber that will be abandoned or temporary fiber that is installed to keep a network segment operation during construction shall be removed upon cutover to the new fiber.
12. The following performance criteria must be met by the non-pre-terminated fiber optic outside plant cable.
 - a. For all new Single-Mode cable plant- OS2 8.2 Micron, Single mode Fiber: Corning Cable Systems 006ESF-T4101D20, 012ESF-T4101D20 and/or 024ESF-T4101D20.

(1)	Core diameter:	8.2 microns
(2)	Cladding diameter:	125 microns
(3)	Wavelengths	1310 nm / 1383 nm / 1550 nm
	Maximum Attenuation:	.4 dB/km / .4 dB/km / .3Db/KM
(4)	Serial 1 Gigabit Ethernet Distance	5000 m / -m / -m.
(5)	Serial 10 Gigabit Ethernet Distance	10000 m / -m / 40000 m
13. Fiber optic cable shall be labeled with machine generated, self-laminating labels, in addition to other requirements of these specifications, to show Micron size, Origin and Destination.

B. CONNECTORS

Each of the single mode fibers shall be terminated in high performance glass/ceramic connectors. Connectors shall be "LC" fusion spliced as listed in the Materials Specifications.

1. For 8.2 micron single mode fiber, all strands shall be fusion sliced using specified connectors.
2. Plastic connectors will not be accepted.

C. FIBER DISTRIBUTION CABINETS / PATCH PANELS

1. Pre-terminated fiber cables shall be installed in Panduit FLEX-1U or FLEX-4U trays with FLEX-PLATE1U or FLEX-PLATE4U management trays.
2. Panduit FHC9N-12-10AS cassettes shall be used at the MDF end.
3. Panduit FHC9N-12-10AF cassettes shall be used at the IDF end.

4. Rack mounted Fiber Distribution Cabinets (FDC) shall have connector panels installed at the MDF and the IDF's. Contractor shall field verify FDC and connector panel requirements at the MDF and IDF's. FDC's shall contain rear and side entry slots and retainers for fiber optic strand loops and mounting tabs for loose tube fiber breakout (AKA fanout) kits. The rack mounted fiber distribution cabinet herein shall be enclosed top, bottom, and all sides providing complete protection for the fiber strands. Furnish with clear front access panels, label fields, and jumper cable troughs for cable management. Rear of cabinet shall be accessible for future work or repairs.
5. Fibers installed in FRME1U's or FRME2U's shall be installed in protective type loom to prevent fibers from getting caught or pinched in the sliding tray slots of the FRME1/2U.
6. Each connector-mounting panel shall be provided with 6 (6 duplex) high-density LC couplings for termination of fiber cables with LC connectors. Spare blank FAPB connector mounting panels shall be provided for any unused bays at the time of the installation.
7. Where fiber optic cable is placed in an existing FDC located in the MDF or IDF, contractor shall provide and install the necessary additional connector panels. Should an existing FDC lack the required expansion room, contractor shall install an additional FDC meeting the above requirements. Panduit FC29N-12-10AS and Panduit FC29N-12-10AF QuickNet cassettes can be used in existing FDC when MPO fiber is being installed. The **AS is used at the MDF end and the **AF is used at the IDF end.
8. LC Blue duplex high density connector panels shall be used for single mode 8.2 micron OS2 fiber.
9. All FDC's shall have a label identifying Micron size installed and MDF/IDF destinations.

2.07 CATEGORY 6A UNSHIELDED TWISTED PAIR COPPER DATA CABLING

A. PERMANENT LINK

1. Panduit TX6A 10GIG, PUR6A04BU-UG Riser or PUP6A04BU-UG Plenum, as required by installation ratings, Category 6A, 4 pair UTP, CMR or CMP rated 23 AWG solid-copper conductors, insulated with high-density polyethylene color-coded coating and an overall Blue PVC jacket.
2. UL certified to EIA/TIA-568C.1, .2 and .3 for Category 6A and UL listed type CM cable.
3. Electrical and transmission characteristics shall comply with TIA/EIA-568-C.2-1, August, 2012.
 - a. Wire map
 - b. Propagation delay
 - c. Delay skew
 - d. Length
 - e. Insertion loss
 - f. Return loss
 - g. Near-end crosstalk (NEXT) loss
 - h. Power sum near-end crosstalk (PSNEXT) loss
 - i. Equal-level far-end crosstalk (ELFEXT)
 - j. Power sum equal-level far-end crosstalk (PSELFEXT)
 - k. Frequency: Up to 350MHz

4. Category 6A Permanent Link cables shall be no longer than 297 feet / 90 meters electrically. Reflected FEXT can affect NEXT loss under these short conditions. Permanent Link cable lengths, as reported on test results or spot tested, will be used for compliance.
5. Cable terminations shall comply with the manufacturers installation instructions. All cable jackets must terminate inside the connector body with no exposed pairs observable from the rear. Cables terminations not in compliance shall be re-terminated and re-tested at no cost to the District.

B. JACKS

1. Jacks: Two, four or six, modular 8 position/8 conductor, Category 6A jacks per faceplate for connecting hardware specified in EIA/TIA 568C.1-3. Jacks snap and lock into faceplate. Jacks shall be Panduit "International White" in color except for the Green, Yellow, Orange, Red, Blue, Black, International Grey, White and Violet jacks where used in combination faceplates. See Standard Faceplate Port Configuration Types for specific combinations of jack types and colors. Jacks shall conform to the EIA/TIA 568C.1-3 wiring scheme (568B).

C. UTP MODULAR PATCH PANEL

1. MDF's- 24 port angled front, all steel modular jack patch panel to allow installation of modular snap-in, 8 position 8 conductor Panduit MiniCom modular Category 6A data jacks. Panels shall meet the requirements for connecting hardware as specified in EIA/TIA-568C.1-3. Refer to MDF/IDF elevation views for specific patch panel being used.
2. IDF's- 24 port angled front or 24, or 2 port flat front, all steel modular jack patch panel to allow installation of modular snap-in, 8 position 8 conductor Panduit MiniCom modular Category 6A data jacks. Panels shall meet the requirements for connecting hardware as specified in EIA/TIA-568C.1-3. Refer to IDF elevation views for specific patch panel being used.
3. Punch Down 110 type patch panels shall not be used.
4. Panels shall be a 19" rack mounted unit.
5. IMI Data Product cabinets may utilize flat 2U, 48 or 72- port high-density all metal modular snap-in jack type patch panels.
6. Patch Panel jack color scheme shall match the work area outlet color scheme to include the "International White, IW" in color except for the Green, Yellow, Orange, Red, Blue, Black, International Grey, Electrical Ivory, White and Violet jacks installed at the Station End.
7. Furnish in quantities as required to match station cable terminations as shown on elevation drawings. Only two (2) standard classrooms shall be installed on each 24 port patch panel. With the exception of labs, library or other high port count areas, patch panels shall be populated in a continuous progression. See Rack Elevation drawings for specific patch panel arrangements. Rack elevation drawings indicate order and spacing on each patch panel. IP Clock Speaker, WAP's Security Cameras and other special use data jacks shall terminate on separate patch panels as shown in the MDF/IDF rack elevation drawings. Where it is not clear, the contractor shall submit an RFI for clarification before proceeding with the installation.
8. Unused patch panel openings shall have CMBBL-X blank fillers installed.

9. Where a Panduit KWP6P faceplate is used for a wall phone, a CJ6X88TGGR (Green) shall be installed at the patch panel in the MDF or IDF.

D. WORK AREA OUTLETS

1. Faceplate: See Standard Faceplate Port Configuration Types drawing for configuration of each faceplate as noted on drawings. Provide a vertical sloped type, modular faceplate for housing two or more modular jacks. Faceplates shall be furnished with two or four mounting screws for installation in electrical outlet boxes. Faceplates shall be Panduit "International White, IW" in color. Faceplates are shown in a vertical mount configuration. Where the application requires a horizontal mount, the faceplate shall be changed to a corresponding horizontal sloped type faceplate. The Data Contractor shall issue an RFI for review and approval prior to installation.
2. Jacks: Two, three, four or six, modular 8 position/8 conductor, Category 6A jacks per faceplate for connecting hardware specified in EIA/TIA 568C.1-3. Jacks snap and lock into faceplate. Jacks shall be Panduit "International White, IW" in color except for the Green, Yellow, Orange, Red, Blue, Black, International Grey, White and Violet where used in combination faceplates or applications. See Standard Faceplate Port Configuration Types for specific combinations of jack types and colors. Jacks shall conform to the EIA/TIA 568C.1-3 wiring scheme (568B).
3. Cables and faceplates, where installed in surface-mount conduit/raceways, in-wall conduits stubbed above ceiling line, floor conduits, junction boxes or as shown on drawings, shall contain separate channels for data and electrical cables where applicable.
4. Panduit Audio Visual Modules as shown on the Standard Faceplate Schedule shall be installed at all AV locations.
5. Where Panduit AV modules are install on the Type "G" and "H" faceplates, the HDMI, RCA and 3.5MM audio connectors shall have Hot Glue applied to the connector/cable connection to prevent separation.
6. If required by the installation, 1-gang faceplates may be substituted with a larger 2-gang faceplate. Unused port openings shall have blank filler modules installed. Any substitution must be of the sloped entry type.

2.08 MULTI- PAIR UTP CABLES

A. INDOOR CABLES

1. Indoor cables shall be PVC jacketed, 24 AWG with industry standard color code.
2. Cables shall be rated for Category 5e or higher.
3. Pair quantities shall be for the application.

B. OUTDOOR CABLES

1. Outdoor cables shall be Polyethylene jacketed, 24 AWG with water blocking flooding compound.
2. Cables shall be rated for Category 5e or higher.
3. 4, 6, 12, 25 or 50 pair counts shall be used.
4. Inter-building cables shall be bonded to the TMGB or TGB where they enter the building.
5. Cable runs greater than one hundred forty (140) feet shall have protector blocks installed at each end.

6. Cables shall bond to the TMGB or TGB.
7. Protector blocks shall bond to the TMGB or TGB.

2.09 CABLE TELEVISION, DISTRIBUTION CABLE AND COMPONENTS

Refer to CATV Wiring and Distribution Plan or Data Cable Schedule for specific campus wiring diagrams.

A. COMPONENTS

1. PASSIVE COMPONENTS: Splitters, combiners, tilt compensators, and other such devices shall be attached to plywood backboards in electrical closets using wood screws. All components shall be bonded to the backboard's TMGB or TGB per EIA electrical grounding specifications herein. Ground cables shall be attached to each component per manufacturer's specifications or in attached ground lugs and are not to be simply twisted onto or around mounting screws.
2. ACTIVE COMPONENTS: Amplifiers and other such devices shall be attached to plywood backboards in electrical closets using wood screws. All components shall be bonded to the TMGB or TGB per TIA/EIA electrical grounding specifications herein. Power cables and transformers shall be neatly routed and plugged in to electrical outlets with adequate amperage capacity.

B. OUTSIDE PLANT BACKBONE DISTRIBUTION CABLE

1. Backbone distribution cabling shall be run in a 'star' configuration. Each building's backbone run shall originate at the campus head end (typically located at the MDF) and shall run unbroken and un-spliced to each IDF.
2. Backbone cable shall be wet-rated and suitable for direct burial, though it shall be run in rigid conduit underground between buildings. Cable shall have a polyethylene outer jacket with gel filled inner layers capable of water resistance over thirty years. PVC jacketed cables will not be accepted.
3. For semi-rigid "hardline- 625" cable, underground conduit system of sweeps, pull boxes, and conduits shall accommodate CATV distribution cable free of kinks, jacket splits, or splices. Cable features a minimum bend radius of 36" and maximum pull resistance of 475 pounds. Conduit must be sized and bends designed to accommodate this type of cable. Runs shall have no more than two 90-degree bends in 100 lineal feet. Pull boxes shall be installed every 100 lineal feet. In-ground boxes shall be set such that conduits enter above the floor of the box so that water and dirt do not flow back into the conduits. Cables routed through ground boxes shall have the same bend radius limitations. Boxes shall have a six foot deep, six inch perforated, drain pipe filled with drain rock installed in box floor.
4. Cable shall have an impedance of 75 Ohms plus or minus 2 Ohms.
5. Cable attenuation:
 - a. 625 cables shall have a maximum attenuation of .13 dB per 100 feet at 55 MHz and 2.07 dB per 100 feet at 1000 MHz.

C. CATV TERMINATIONS

1. Terminations shall be multi-part mechanical designs with environmental and RF leakage protection features. District standard is Thomas & Betts Snap-N-Seals (SNS) connectors and multi-piece hardline connectors.
2. Use three part hardline connectors as specified on 625 hardline.

3. No crimp terminations shall be used.
4. Specialized tools designed for the termination system shall be used. Use of utility knife or other cutting tools shall not be used.
5. No terminations shall be made in below grade pull boxes
6. No terminations shall be made in an environment where they are exposed to abnormal levels of heat, chemicals, or humidity, heat shrink moisture and corrosion protection wraps shall be applied where the cable and terminator meet.
7. Manufacturer termination procedures are to be followed.
8. All Coaxial connectors shall be mechanically tightened. No connector shall be left "Finger Tight".

2.10 MATERIALS

- A. The following components have been approved for use and installation into District projects. Not all components listed may be used on this project. Use specific components as listed on the drawings.

- B. PANDUIT COMPONENTS- District Standard

1. PANDUIT FACEPLATES

- a. Station faceplates- CFPSL2IWY- sloped front, 2 port
- b. Station faceplates- CFPSL4IWY- sloped front, 4 port
- c. Station faceplates- CFPSL6IW- sloped front, 6 port
- d. Station faceplates- T70FH4IW- horizontal sloped front, 4 port
- e. Station faceplates- T70FV2- sloped front vertical 2 port
- f. Station faceplates- T70FV4- sloped front vertical 4 port
- g. Station faceplates- UICFPSE8IW-2G- 2 gang sloped front, 8 port
- h. Decora Module Frames- CFG4IW,-4 port
- i. Decora Faceplate- CPGIW- Used at Pixie Controller Location
- j. Stainless Phone Plate with Category 6 jack module- KWP6PY

2. PANDUIT INSERTS

- a. Inserts- CJ6X88TG**- **=
IW/GR/YL/VL/IG/BL/BU/EI/RD/BR/PK/GD/OR/WH- Data jacks
- b. Inserts- CMB**X- **=
IW/BL Blanks
- c. Inserts- CMFIW - F jack modules
- d. Inserts- CMRP*IW (*=R, Y, W)-*= Red, Yellow, White Pass-through RCA Jack modules
- e. Inserts- CMD15HDCIWY- VGA Coupler module
- f. Inserts- CMHDMIW- HDMI Coupler module
- g. Inserts- CM35MSCIWY- 3.5mm stereo audio coupler module
- h. Up/Down 45 degree termination caps- CJUDCAPBU-X TX6A
- i. Left Right 45 degree termination caps- CJLRCAPBU-X TX6A
- j. Field Terminable RJ45 Plug- FP6X88MTG- Used at Security Camera, IP Clock Speaker station ends and other locations as designated. Cable to be tested as a Channel.

3. PANDUIT SURFACE MOUNT BOXES

- a. 1 port box- CBX1IW-A
- b. 2 port box- CBX2IW-AY
- c. 4 port box- CBX4IW-AY

- d. 6 port box- CBXD6IW-AY
 - e. 1-gang box- JBP1DIW
 - f. 2-gang box- JBP2DIW
4. PANDUIT PATCH PANELS
- a. Category 6A Angled Front Patch Panels- CPPLA24WBLY, 24 port modular patch panel, rack mount. Used in Data Racks, Data Cabinets
 - b. Category 6A Patch Panels- CPPL24WBLY, 1U, 24 port modular patch panel, rack mount. Used in High Density Wall Mount Cabinets only
 - c. Voice Patch Panel- VP24382TV25Y, 1U 24 port patch panel, pins 4/5 active with RJ21X telco connector on rear panel.
5. PANDUIT RACK AND CABINETS
- a. Blank fillers- TLBP1R-V, 1U horizontal blank panel
 - b. Blank fillers- CPAF1BLY, Angled filler panel
 - c. 7 Foot, Two Post Rack- R2P
 - d. Rack Waterfall Kit- CMW-KIT
 - e. Vertical PDU Power Strip- CMRPSVD20
 - f. Rack Mount Power Strip- CMRPSH20
 - g. Net-Access N-Type Cabinet with side panels- N8522BV
 - h. Net-Access N-Type Cabinet without side panels- N8529BVi. Vertical Exhaust Ducting- C2VED08I1626B1
6. PANDUIT FIBER OPTICAL
- a. HD Flex MTP Fiber Optic
 - 1. 12 strand single mode MTP/MPO cable- F9TNP5E5EACM***. *** = footage
 - 2. FLEX Fiber Tray 1U- FLEX1U. Holds 12 cassettes
 - 3. FLEX Fiber Tray 4U- FLEX4U. Holds 48 cassettes
 - 4. FLEX Cable Management 1U Tray- FLEX-PLATE1U
 - 5. FLEX Cable Management 4U Tray- FLEX-PLATE4U
 - 6. Opticom Zero RU QuickNet MTP Cassette Magnetic/Adhesive- FEABRUA
 - 7. Opticom Zero RU QuickNet MTP Cassette Rack Mount- FEABRU
 - 8. Opticom Zero RU QuickNet SFQ Cassette- FQCRCM
 - 9. HD Flex Zero RU Cassette Holder- FLEX-0RUBR04
 - 10. FLEX MTP Cassette MDF End, Single mode- FHC9N-12-10AS
 - 11. FLEX MTP Cassette IDF End, Single mode- FHC9N-12-10AF
 - 12. FLEX MTP Single mode Splice Cassette- FHS9N-12-10P. One end requires fiber pair flipping when splicing.
 - 13. FLEX MTP Single mode LC Cassette- FHS9N-12-10N
 - 14. Quick Net MTP Cassette MDF End, Single mode - FC29N-12-10AS
 - 15. Quick Net MTP Cassette IDF End, Single mode - FC29N-12-10AF
 - 16. OptiCam Fiber Optic- WHERE PERMITTED
 - 17. LC OM4 MM FUSION SPLICE PIGTAIL- FZB10-NM1
 - 18. LC OS2 SM FUSION SPLICE PIGTAIL- F9B10NM1Y
 - b. Fiber Optic Enclosures
 - 1. Fiber Distribution Cabinet- FRME1U-Opticom Fiber Rack Mount Enclosure, Accepts 3 FAP panels and FOSM Fiber Optic Splice Modules
 - 2. Fiber Distribution Cabinet- FRME2U-Opticom Fiber Rack Mount Enclosure, Accepts 6 FAP panels and FOSM Fiber Optic Splice Modules

3. Fiber Distribution Cabinet- FRME4-Opticom Fiber Rack Mount Enclosure, Accepts 12 FAP panels
 4. Fiber Distribution Cabinet- FCE4U- Opticom Fiber Rack Mount Enclosure, Accepts 12 FAP panels and FOSM Fiber Optic Splice Modules
 5. Fiber Media Tray- FMT1- Opticom Rack Mount Enclosure, Accepts CFAPPBL1 Fiber Adapter Patch panel which hold 4 FAP Fiber Adapter Panels or FAPB Blanks
 6. Wall Mount Fiber Distribution Box- FWME2 holds 2 FAP panels
 7. Fiber Splice Module Tray- FOSMF- Use one per 12 strand fiber cable
 8. Fiber Adapter Patch Panel- CFAPPBL1- Holds 4 FAP Adapter Panels
 9. Fiber Splice Module Handler- FOSMH4U- Use with FCE4U Fiber Cabinet
 10. Fiber Adapter Panels- FAP6WEIDSC, 6 SC Duplex connectors- one required for each 12 strand OM1 or OM2 fiber optic cable end
 11. Fiber Adapter Panels- FAP6WAQDLCZ, 6 LC Duplex connectors- one required for each 12 strand OM4+ fiber optic cable end
 12. Fiber Adapter Panels- FAP12WAQDLCZ, 12 LC Duplex connectors- one required for each 24 strand OM4+ fiber optic cable end
 13. Fiber Adapter Panels- FAP6WST, 6 ST connectors
 14. Fiber Adapter Panels- FAP6WBUDLCZ, 6 LC Duplex SM connectors- one required for each 12 strand OS2 fiber optic cable end
 15. Fiber Adapter Panels- FAPB, Blank Panel
 16. Fiber management spool- CFS2IW In-Wall Fiber Spool
7. PANDUIT WIRE MANAGEMENT
- a. Vertical Wire Management- PRV8 REQUIRES 2- PRD8 Doors
 - b. Vertical Wire Management- PRV10 REQUIRES 2- PRD10 Doors
 - b. Horizontal Wire Management- NM2- Front/rear 2U hinged door
 - c. Horizontal Wire Management- NMH2- Front 2U hinged door
 - d. Wire Manager Divider Blanks- NM2B- Each NM** requires 2
 - e. Vertical Wire Management- WMPV22E for 36" wall rack
 - f. Cable Management Bend Radius Device (Waterfall)- CMWB
 - g. Cable Management Bend Radius Device (Waterfall)- CMW-KIT
 - h. J-Hooks- JP2DW-L20 8. J-Hooks- JP2W-L20- for wall mount applications
 - i. Conduit Waterfall- CWF400- for 4" EMT conduit

USE ANY OF THE J-PRO SERIES CABLE SUPPORT ADAPTERS AS REQUIRED BY THE INSTALLATION

8. PANDUIT DATA CABLE
- a. TX6A 10GIG- PUR6A04BU-UG CMR Cat 6A 350 MHz Riser
 - b. TX6A 10GIG- PUP6A04BU-UG CMP Cat 6A 350 MHz Plenum
 - c. TX5500 5e Shielded- PFR5504BU-UY CMR Cat 5e- Used at specific AV locations Riser
 - d. TX5500 5e Shielded- PFP5504BU-UY CMP Cat 5e- Used at specific AV locations Plenum
9. PANDUIT RACEWAY
- See Panduit catalog for additional raceway components not listed. "T" Series raceways can carry both power and data when required divider wall and separation devices are used in the assembly.

Single Raceway- High Fill Ratio

- a. Raceway Components- TG70IW-8/10 Raceway and cover in 8', 10' lengths

- b. Raceway Components- TGDW- 8/10 foot Power/Data Divider
 - c. Raceway Components- TG70BCIW-X- Base coupler fitting
 - d. Raceway Components- T70CCIW-X- Cover coupler fitting
 - e. Raceway Components- TGRAIW- Right angle fitting
 - f. Raceway Components- TGICIW- Inside corner fitting
 - g. Raceway Components- TGOCIW- Outside corner fitting
 - h. Raceway Components- TGECIW- End cap fitting
 - i. Raceway Components- TGEEIW- Entrance end fitting
 - j. Raceway Components- TGBF- TG70 Backfeed Fitting
 - k. Raceway Components- TGTIW- Tee Fitting
 - l. Raceway Components- TGTD- Tee Divider required to maintain High/Low Voltage Cables
 - m. Raceway Components- T70DB-X- Device bracket
 - n. Raceway Components- T70WR-X- Wire Retainer
 - o. Raceway Components- TG70HB3IW-X- Workstation outlet center for data or power
- See Panduit catalog of other raceway components

Single Raceway- Low Fill Ratio

- a. Raceway Components- T70BIW- 8/10- Raceway in 8', 10' lengths
 - b. Raceway Components- T70CIW-8/10- Raceway Cover in 8', 10' lengths
 - c. Raceway Components- T70DW- 8/10 foot Power/Data Divider
 - d. Raceway Components- T70BCIW-X- Base coupler fitting
 - e. Raceway Components- T70CCIW-X- Cover coupler fitting
 - f. Raceway Components- T70RAIW- Right angle fitting
 - g. Raceway Components- T70ICIW- Inside corner fitting
 - h. Raceway Components- T70OCIW- Outside corner fitting
 - i. Raceway Components- T70ECIW- End cap fitting
 - j. Raceway Components- T70EEIW- Entrance end fitting
 - k. Raceway Components- T70BF- TG70 Backfeed Fitting
 - l. Raceway Components- T70HB3IW-X- Workstation outlet center for data or power
 - m. Raceway Components- T70TRIW- T70 Transition Fitting
 - n. Raceway Components- T70DB-X- Device bracket
 - o. Raceway Components- T70WR-X- Wire Retainer
 - p. Raceway Components- T70TIW- Tee Fitting
 - q. Raceway Components- T70TD- Tee Divider required to maintain High/Low Voltage Cables
- See Panduit catalog of other raceway components

Twin Raceway

- a. Raceway Components- T702BIW- 8/10- Raceway in 8', 10' lengths
- b. Raceway Components- T70CIW-8/10- Raceway Cover in 8', 10' lengths
- c. Raceway Components- T70DW- 8/10 foot Power/Data Divider
- d. Raceway Components- T702BCIW-X- Base coupler fitting
- e. Raceway Components- T702CCIW-X- Cover coupler fitting
- f. Raceway Components- T702RAIW- Right angle fitting
- g. Raceway Components- T702ICIW- Inside corner fitting
- h. Raceway Components- T702OCIW- Outside corner fitting
- i. Raceway Components- T702ECIW- End cap fitting
- j. Raceway Components- T702EEIW- Entrance end fitting
- k. Raceway Components- T70HB3IW-X- Workstation outlet center for data or power
- l. Raceway Components- T70DB-X- Device bracket

- m. Raceway Components- T702TIW- Tee Fitting
- n. Raceway Components- T702TRI- Tee Divider required to maintain High/Low Voltage Cables
- o. Raceway Components- TG70WR-X- Wire Retainer
See Panduit catalog of other raceway components

Mid- Sized Raceway

- a. Raceway Components- T45BIW- 8/10- Raceway in 8', 10' lengths
- b. Raceway Components- T45CIW-8/10- Raceway Cover in 8', 10' lengths
- c. Raceway Components- T45DW- 8/10 foot Power/Data Divider
- d.
- e. Raceway Components- T45RAIW- Right angle fitting
- f. Raceway Components- T45ICIW- Inside corner fitting
- g. Raceway Components- T45OCIW- Outside corner fitting
- h. Raceway Components- T45ECIW- End cap fitting
- i. Raceway Components- T45EEIW- Entrance end fitting
- j. Raceway Components- T70DB-X- Device bracket
- k. Raceway Components- T45WR-X- Wire Retainer
- l. Raceway Components- T45TIW- Tee Fitting
- m. Raceway Components- T45TD- Tee Divider required to maintain High/Low Voltage Cables
See Panduit catalog of other raceway components

Low Capacity Raceway

- a. Raceway Components- LD10- 1" Raceway
- b. Raceway Components- LD5- .75" Raceway
- c. Raceway Components-RAFX10IW- Right Angle Fitting
- d. Raceway Components- ICFX10IW- Inside Corner Fitting
- e. Raceway Components- OCFC10IW-Outside Corner Fitting
- f. Raceway Components- ECFX10IW- End Cap Fitting
- g. Raceway Components- CFX10IW- Cover Cap Fitting
- h. Raceway Components-RAFX5IW- Right Angle Fitting
- d. Raceway Components- ICFX5IW- Inside Corner Fitting
- e. Raceway Components- OCFC5IW- Outside Corner Fitting
- f. Raceway Components- ECFX5IW- End Cap Fitting
- g. Raceway Components- CFX5IW- Cover Cap Fitting
See Panduit catalog of other raceway components

Misc. Raceway Components

- a. Raceway Components- CP106IW Duplex plug cover
- b. Raceway Components- CPGIW Decora style plug cover
- c. Raceway Components- T70FH2IW, 2 port snap on faceplate, horizontal
- d. Raceway Components- T70FH4IW, 4 port snap on faceplate, horizontal
- e. Raceway Components- T70FV2, 2 port snap on faceplate, vertical
- f. Raceway Components- T70FV4, 4 port snap on faceplate, vertical
- g. Raceway Components- T70PGIW/ T70PIW, Snap on duplex electrical cover
- h. Raceway Components- JBP1DIW, 1 gang J-Box
- i. Raceway Components- JBP2DIW, 2 gang J-Box
See Panduit catalog of other raceway components

10. PANDUIT LABELING

LS8 PORTABLE PRINTER LABELS

- a. 1.5"x.5", self-laminating wire makers- S100X150VAC
- b. 2.25"x.75", self-laminating wire makers- S100X225VAC
- c. 4"x.1", self-laminating wire makers- S100X400VAC
- d. 6"x.1.5", self-laminating wire makers- S100X650VAC
- e. .3"x.61" One-Port- C061X030FJC
- f. .3"x1.25" Two-Port- C125X030FJC
- g. .3"x1.88" Three-Port- C188X030FJC
- h. .3"x3.79" Six-Port- C379X030FJC
- i. .3"x2.61" Four-Port for CPPLA Patch Panels- C261X030FJC
- j. 0.236"x25' UID Labels- UILS8BW

OTHER LABELS

- a. Fiber Optic Cable Marker Tags- PST-FO
- b. Ground Wire Tag- LTYK

Labeling Components Software-

- a. Easy-Mark Label Software

11. PANDUIT GROUNDING/BONDING

- a. TMGB- GB4B0624TPI-1
- b. TGB- GB2B0306TPI-1
- c. Rack Grounding Strip- RGS134-1Y
- d. Thread Forming Screws- RGTS-CY
- e. Bonding Screws- RGTBSG-C
- f. Paint Piercing Washers- RGW-32-1Y
- g. Equipment Jumper Kits- RGEJ1024PFY
- h. Bonding Jumper- RGCBNJ66OPY
- i. Pipe Ground Clamp- GPL-8-Q
- j. Pipe Ground Clamp- GPL-15-X
- k. Pipe Ground Clamp- KP1-C
- l. Pipe Ground Clamp- KP2-L
- m. H-Taps- HTCT2-2-1
- n. Code Conductor, Two Hole, Long Barrel Lug- LCC10-14JAW-L- #10, Bonding to rack, TMGB, 1/4" holes.
- o. Code Conductor, Two Hole, Long Barrel Lug- LCC6-10ABW-L- #6, Bonding to rack, #10 holes.
- p. Code Conductor, Two Hole, Long Barrel Lug- LCC6-14JAW-L- #6 Flat, 1/4" holes
- q. Code Conductor, Two Hole, Long Barrel Lug- LCC6-14JAWH-L- #6 45 degree bent, 1/4" holes.
- r. Code Conductor, Two Hole, Long Barrel Lug- LCC2-38DW-Q- #2 Flat, 3/8" holes.

C. CHATSWORTH PRODUCTS INC. Data Racks / Grounding / Cable tray / J-Hooks

1. RACK

- a. 19" Wall Mount Rack- 15320-724 (38.5" high x 24" deep, black anodized).
- b. Flush Mounted Wall Bracket- 11583-719
- c. Extra Capacity Flush Mounted Wall Bracket- 11754-719
- d. Corner Cushions, Wall Rack Corners- 12858-001

2. SHELVES/SERVER BRACKETS

- a. 19" Low Profile Shelf- 11294-719

- b. Heavy Duty Shelf-11164-719
- c. Locking Storage Drawer-13084-719
- d. AnyServer Bracket, 1U- 12751-719
- e. AnyServer Bracket, 2U- 12752-719
- f. Metric 36, M6, cage nuts, 4 required for each bracket- 12637-001
- g. 10-32 cage nuts, 4 required for each bracket- 12638-001
- h. 12-24 cage nuts, 4 required for each bracket- 12639-001

3. GROUNDING/BONDING

- a. TMGB-MDF Grounding BusBar Kit, Wall-Mount- 4"x20"- 40153-020
- b. TMGB-IDF Grounding BusBar Kit, Wall-Mount- 4"x12"- 40153-012
- c. TGB Grounding BusBar Kit, Wall Mount- 4"x10"- 13622-010
- d. Cable Runway Grounding Kit- 40164-001

4. CABLE RUNWAY

- a. 12" Cable Runway- 10250-712
- b. Butt- Splice Kit- 11301-701
- c. Junction- Splice Kit- 11302-701
- d. Channel Rack-to-Runway Mounting Plate with Hat Bracket- 12730-712
- e. Triangular Support Bracket- 11312-712
- f. J- Bolts- 11431-001
- g. Wall Angle Support Kit- 11421-712
- h. Protective End Caps, Cable Runway- 10642-001
- i. End Closing Kit- 11700-712

D. IMI DATA PRODUCTS

- 1. Wall Mount cabinet- SRVUSD Custom cabinet, drawing #100499 when ordering

E. ERICO CADDY FASTENERS

- 1. J-Hooks, Cat 12, Cat 21, Cat 32

F. CORNING CABLING AND ACCESSORIES

USE CABLE AS SPECIFIED IN THE PROJECT SPECIFIC CABLE SCHEDULES- CABLE SCHEDULE TAKES PRIORITY

- 1. FREEDOM/LST 8.2 OS2 Single mode- ***ESF-T4101D20. ***= number of strands
- 2. Corning Buffer Tube Fan-Out Kit- FAN-BT25-06, 25 inches, 06 strands
- 3. Corning Buffer Tube Fan-Out Kit- FAN-BT25-12, 25 inches, 12 strands
- 4. Corning 8.2 Micron Single mode UniCam OS2 Connector- 95-200-99 LC- WHERE PERMITTED
- 5. Corning 8.2 Micron Single mode OS2 Fusion Splice Pigtail, 900 micron cable- 000201R41310003M

(*** = number of fiber strands)

G. CARLON NON-METALLIC CONDUIT (Innerduct)

- 1. Riser-Gard Innerduct flexible raceway- 3/4" DE4X1C

H. BELDEN CABLES

USE CABLE AS SPECIFIED IN THE PROJECT SPECIFIC CABLE SCHEDULES

- 1. Series 6, RG-6 above ground PVC jacket- 1189A
- 2. Series 6, RG-6 below ground Polyethylene jacket- 1190A
- 3. Series 11, RG-11 above ground PVC jacket- 1523A
- 4. Series 11, RG-11 below ground Polyethylene jacket- 1525A
- 5. Series 59, RG59 Wireless Microphone Antenna- 1426A

6. Audio Speaker Cable- 5T00UP, 10/2
7. IP Zone Speaker or AV cable- 5100UE, 14/2
8. IP Zone Speaker or AV cable- 5200UE, 16/2
9. IP Zone Speaker cable- 5202UE, 16/4
10. Crestron Power- 5200UE
11. AV Control Cable- 1502R
12. Pixie Control Cable- 5301FE
13. Line Level Audio Microphone cable- 5400FE, 20/2
14. Line Level Audio Microphone cable- 5500FE, 22/2
15. RG-8X 50 Ohm Low Loss Antenna cable- 7808A

I. COMMSCOPE CABLING

1. Coaxial CATV Cable- Commscope P3 625 JCASS Wet rated Underground Backbone cable

J. THOMAS AND BETTS COAXIAL CABLE CONNECTORS

1. Snap-N-Seal F-type RG-6 quad shield- SNS6QS, SNS1PQS
2. Snap-N-Seal F-type RG-6 non quad shield- SNS6, SNS1P6
3. Snap-N-Seal F-type RG-11- SNS11AS
4. Snap-N-Seal BNC type RG-59- SNS59HECBNC
5. 3 Piece Hardline to 5/8"x24 Adaptors for 625 cable - EFI625W3
6. 3 Piece 5/8"x24 to "F" Female Adapter- BAFF

K. MIDDLE ATLANTIC PRODUCTS

1. DWR-12-22, Wall Mount Cabinet, 12 RU spaces
2. PFD-12, Plexi-Glass front door
3. SR-40-22, Wall Mount Cabinet, 40 RU spaces
4. FD-40, Solid front door
5. WR-44-32, Roll-Out Rotating Enclosure, 44RU
6. WRFD-44, Solid Front Door for WR-44-32
7. ISRK, Under Desk Mobile Rack
8. EB1-* - 1U Blank Panel. *=CP12- Contractor 12 pack
9. QBP-2, Quiet Blower Panel, 2 fan, 100CFM

L. CHIEF MANUFACTURING- Projector and Interactive White Board Mounts

1. Wall Mount Arm, Dual Stud- WM220S
2. Wall Mount Arm, Dual Stud- WM230S
3. Suspended Ceiling Mount Kit- CMS440.
4. Truss Ceiling Adapter- CMA-365
5. Projector Stabilization Kit- CMA340 (Required when using CMA-365)
6. Ceiling Plate- CMA110
7. Security Cage- PG-1, PG-2, PG-3
8. IWB Mount- WBM2
9. IWB Universal Mount- WBM2U
10. IWB Extender Kit- WBAE

M. COMPREHENSIVE VIDEO

1. 25 foot HDMI- HD-HD-25PROBLK
2. 35 foot Mini stereo plug to Red/White RCA Male- 2PP-25ST
3. USB A/B- USB2AB-10

N. NEUTRIK AUDIO CONNECTORS

1. XLR Male- NC3MX Plug

2. XLR Female-NC3FD-L-1, XLR Female Chassis Mount Jack
3. XLR Female, NC3FX Plug
4. SPEAKON- NL2MP, 2 pole Chassis Mount Jack
5. SPEAKON- NL4MP, 4 pole Chassis Mount Jack
6. SPEAKON- NL2FC, 2 pole Connector Plug
7. SPEAKON- NL4FC, 4 pole Connector Plug
8. USB- NAUSB, USB Feed Through , A to B

O. STI, SPECIFIED TECHNOLOGIES, INC. FIRESTOP SYSTEMS

1. 1.5" Pathway- EZD22
2. 3" Pathway Kit- EZDP33FWS
3. 3" Pathway extension- EZD33E
4. 3" Conduit Adapter Kit- EZDP133CAK
5. 3" Mounting Double Pathway Kit- EZDP233GK
6. 3" Mounting Triple Pathway Kit- EZDP333GK
7. 3" Mounting Quad Pathway Kit- EZDP433Gk

Verify other STI products for use at time of installation

P. CIRCA TELCOM – Protectors

1. 6pr- 2606QC/QC
2. 12pr- 2612QC/QC
3. 25pr- 2625QC/QC
4. 50pr- 2650QC/QC

Q. GENERAL CABLE

1. Projection System Program Cable- C0755A.41.10
2. Projection System Relay/IR Cable- C0763.21.10

R. BTX TECHNOLOGIES INC.

1. PL-103E, "D" Series 1 hole XLR/Speakon faceplate
2. PL-203E, "D" Series 2 hole XLR/Speakon faceplate

S. LIBERTY WIRE & CABLE

1. PCD-5750-BLK, XLR Jack in Black Decora Frame

T. CABLES 2 GO (C2G)

1. VGA With Audio, 15 Foot- 50227
2. VGA With Audio, 25 Foot- 50228
3. VGA With Audio, 35 Foot- 50229
4. VGA With Audio, 50 Foot- 50230
5. HDMI, 1.5 Foot- 42500
6. Red/White RCA to Red/White RCA, 25 Foot- 40131
7. Power Supply Cable, 5-15P to 5-15R/C13- 29812

U. KRAMER CABLES

1. HDMI, 6 Foot- C-HM/HM-6
2. HDMI, 15 Foot- C-HM/HM-15
3. HDMI, 25 Foot- C-HM/HM-25
4. HDMI, 35 Foot- C-HM/HM-35
5. HDMI, 50 Foot- C-HM/HM-50
6. Composite Video/Audio, 15 Foot- C-3RVAM/3RVM-15

7. Composite Video/Audio, 25 Foot- C-3RVAM/3RVM-25
8. Composite Video/Audio, 35 Foot- C-3RVAM/3RVM-35
9. Composite Video/Audio, 50 Foot- C-3RVAM/3RVM-50
10. MP3 Audio-RCA, 15 Foot- C-A35M/2RAM-15
11. MP3 Audio- RCA, 25 Foot- C-A35M/2RAM-25
12. MP3 Audio- RCA, 35 Foot- C-A35M/2RAM-35
13. MP3 Audio- RCA, 50 Foot- C-A35M/2RAM-50
14. RCA-RCA, 3 Foot- C-2RAM/2RAM-3
15. RCA-RCA, 6 Foot- C-2RAM/2RAM-6
16. RCA-RCA, 15 Foot- C-2RAM/2RAM-15
17. RCA-RCA, 35 Foot- C-2RAM/2RAM-35
18. RCA-RCA, 50 Foot- C-2RAM/2RAM-50

V. ARLINGTON INDUSTRIES

1. 1" EMT Conduit Cap- EMT100C
2. 1-1/4" EMT Conduit Cap- EMT125C
3. 1-1/2" EMT Conduit Cap- EMT150C
4. 2" EMT Conduit Cap- EMT200C
5. 2-1/2" EMT Conduit Cap- EMT250C
6. 3" EMT Conduit Cap- EMT300C
7. 4" EMT Conduit Cap- EMT400C
8. 1" Rigid Cap- RGD100
9. 1-1/4" Rigid Cap- RGD125
10. 1-1/2" Rigid Cap- RGD150
11. 2" Rigid Cap- RGD200

W. GARVIN INDUSTRIES

1. 6" Square J-Box, 1-1/2" KO- 6350-1-1/2
2. 1 Gang 1" Raised Cover- 61-1
3. 1 Gang Adjustable Depth- 61-ADJ
4. 2 Gang 1" Raised Cover- 62-1
5. 2 Gang Adjustable Depth- 62-ADJ

X. BERK-TEK

1. Crestron DM Video Shielded Cat 5e- 10043494

Y. WBT- Wire Basket Tray

1. 4"X12"X118" Basket Tray- WBT4x12 S
2. 4"X20"X118" Basket Tray- WBT4x20 S
3. 4"x12" 90 degree elbow- WBT-R90-4x12 PG
4. 4"x20" 90 degree elbow- WBT-R90-4x20 PG
5. 4"x12" Tee- WBT-T-4x12 PG
6. 4"x20" Tee- WBT-T-4x20 PG
7. Wall Termination, 12"- TERM SUPPORT 12
8. Wall Termination, 20"- TERM SUPPORT 20
9. Vertical Drop Out Fitting- VERTICAL DOWN
10. No Splice Ceiling Support 12"- NS CEILING SUPT 12
11. No Splice Ceiling Support 20"- NS CEILING SUPT 20
12. Splice Kit- SPLICE KIT
13. Cable Guides, used at 90 Degree turns- CABLE GUIDE
14. Special Splice Bars, used at 12' to 20' Transition- BAR SPLICE SPECIAL

SECTION 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine site conditions and delivered materials for acceptance of data cabling system installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. GENERAL

1. **Contractor shall blow compressed air through all conduits, prior to cable installation, to insure no debris, rocks, dirt or water remains in conduit. Any non-wet rated cables found to be immersed in water during inspections will be replaced at no cost to the District.**
2. All continuous conduit runs shall be identified to show destination at each end.
3. All conduit ends, sleeves or other pathways used for data or video cables shall have connectors with protective plastic bushings installed prior to pulling cable.
4. In all empty or filled conduits, raceways or innerduct, a pull string shall be left in place.
5. Unused data conduits protruding up through floors in buildings shall be protected with removable closed caps to prevent entry of debris or water.
6. Only approved pulling compounds shall be used in accordance with industry standards and cable jacket types.
7. No MDF racks, IDF racks or fiber optic cable shall be installed until the MDF and or IDF rooms are fully finished. Fully finished is defined as sheetrock finished, plywood backboards installed, room painted, ceiling is finished and closed, all HVAC work within the room is finished, all electrical work finished, locking doors, full door weather-stripping installed, room has a working HVAC system as designed and floor VCT installed or sealer applied.
8. The cabling contractor shall fully coordinate his/her portion of the work with the general contractor and other subcontractors.
9. Install specified data distribution Category 6A Permanent Link cables from the MDF and/or IDF to each computer workstation station jack in the quantity required by the faceplate type.
10. Install one data distribution Category 6A Permanent Link cable, where specified or shown, from the MDF or IDF to each IP Clock/Speaker or IP Speaker. At the Patch Panel End, these cables are terminated in Panduit CJ6X88TGVL jacks. At the Clock Speaker end, these cables are terminated with FP6X88MTG Field Terminable Plugs.
11. Each standard classroom shall typically have a Type "F, G and H" multimedia faceplate with three ports, two (2) Type "B" faceplates with two ports each, a Type "I" with two ports each, one Type "K" single port faceplate at the ceiling WAP location and one Type "J" one port at the IP Clock speaker where shown.

12. The Type "H" located at or near the teacher desk location shall be the starting point of the jack numbering (EX. 101-01/02/03) and progress clockwise around the room. The Type "B" faceplates shall be designated as XX-04/05 and XX-06/07, the Type "I" shall be XX-08/09 with the YELLOW Jack being 09. XX equals finished room number. Verify numbering scheme, if noted, on drawings. In all office space type rooms, jack numbering shall start with the first jack at the desk location. In other rooms, numbering shall start to the left of the entry door and proceed clockwise around the room. All labeling schemes must be approved by the District Technology Project Manager prior to installation.
13. Where classrooms or other rooms do not have a wall/ceiling projector installed, install the data jacks in the faceplate Types in locations as identified on the drawings.
14. All installation work shall be completed in a neat, high quality manner approved by the District Technology Project Manager, and is to conform to all applicable federal, state and local codes and all applicable industry standards as referenced in 1.02 herein.
15. All connections and terminations for the cabling systems shall be made with solderless devices and shall be mechanically and electrically secure. Termination procedures provided by the termination hardware manufacturer shall be followed. Any deviation from these installation directions shall require prior written approval from the District Technology Project Manager.
16. All Permanent Link cables shall be placed in a manner to protect the cable from physical and electrical interference. Cables shall be kept at least the minimum allowable distances from RFI and EMI interference sources, or 12", whichever is less. Low voltage signal cables (excluding fiber optic cables) shall not be run in parallel with any other unshielded cables or power cables. When low voltage signal cables are close to electrical conduits, cables, or fixtures, they shall not be run in parallel with such conduits or fixtures. They shall be run perpendicular to them.
17. Cable bundles installed through J-Hooks or other support devices shall have no more than 12 cables in a bundle and no more than 4 bundles shall be placed in a J-Hook.
18. Do not exceed manufacturer's maximum allowance for pulling tension on cables.
19. Combing and over-tightening of wire ties on Category 6A UTP cabling is prohibited. Cables shall be loosely bundled and secured using Panduit Tak-Tape cable tie fasteners, not cinch type cable ties. Cable bundles shall not be combed; cables must be left randomized to reduce instances of alien cross-talk.
20. Cables that exhibit damage or cable deformation due to the use of cinch ties shall be replaced at the discretion of the District Technology Project Manager and at no cost to the District. HDTDR or HDTDX tests shall be used to verify the condition of the cable or terminations.
21. When cables penetrate a fire rated assembly, approved sleeves and fire proofing compounds shall be installed per manufacturer's specific instructions. See Section 1.01F. All assemblies shall have a one-hour minimum rating. As-built drawings shall include assembly information and precise location(s) of all fire stop assemblies. Project Inspector of Record (IOR) shall inspect all such penetrations for compliance. STI EZ-Path type devices shall be used where required. The use of fire-proof caulks or putties in data conduits is not permitted.
22. All roughed-in Fiber Optic, Category 6A data, audio, video and CATV cables ends shall be stored in such a manner that the cables will not be stretched, walked or stepped on by trade's people or incur other damage that would affect the electrical or light performance

characteristics of the cables. Where such damage is observed by the District Technology Project Manager, District reserves the right to require replacement to its satisfaction. OTDR certifications of the fiber optic cable conditions shall be submitted.

23. All twisted pair cabling installed for analog phone communications shall be tested for wiremap and pair to pair continuity. All pairs must pass or cable shall be replaced at no cost to the District. See Section 4.07 for complete testing specifications.
24. Cabling shall not be kinked. It shall be installed with a minimum bend radius of 10 times its diameter and 3' of service loop or slack at the MDF/IDF end. Work area outlet box slack shall be pulled back, upon termination, to prevent box stuffing. Service loops shall be installed in a sweeping figure 8 pattern, to prevent circular or coiled service loops which add to Return Loss failures.
25. Box stuffing of cable shall not be permitted. Slack shall be pulled back through conduit to nearest open point where service loop can be managed.
26. Self-laminating, machine printed labels shall be applied to each cable end showing finished port number. Use final room numbers with port number.
27. Labels shall be attached to the label tag provided with the faceplate and inserted behind the clear window provided with the faceplate. No surface applied labels will be accepted.
28. Conduits for the Projection Control system shall be installed where shown. See projection conduit schematic for required conduits to be installed. Contractor shall verify all J-box locations with the District Technology Project Manager prior to installation.
29. Use Panduit CJUDCAPBU-X or CJLRCAPBU-X UP/DOWN or LEFT/RIGHT caps where specified.

3.03 RACKS, CABINETS and CABLE TRAYS

Refer to MDF Rack and IDF Rack drawings for specific rack layout(s).

A. DATA RACKS AND CABINETS

1. MDF
 - a. See MDF cable tray layout on MDF Floor Plan.
 - b. Floor mounted data racks shall be secured per manufacturer's instructions. Racks shall be bolted to the floor and secured to the backboard with 12" cable tray installed per manufacturer's instructions.
 - c. Data racks shall be mounted plumb and level and secured per manufacturer's instructions. Where required, shim packs shall be used to set rack(s) level. Where multiple racks exist side by side, racks shall be set plumb and level to each other.
 - d. Each MDF data rack shall be labeled in 24 point black type on a white field with the rack identification label as shown in rack elevations.
 - e. All rack mounting bolts and hardware shall be torqued to manufacturer's specifications.

- f. Data racks, cable tray and other mounting hardware shall be grounded back to the TMGB, TGB or CBN per ANSI/TIA/EIA-607 Electrical Grounding of data communications systems and as shown on the drawings.

2. DEDICATED ROOMS

- a. See IDF cable tray layout on IDF Floor Plan.
- b. Floor mounted data racks shall be secured per manufacturer's instructions. Racks shall be bolted to the floor and secured to the backboard with 12" cable tray installed per manufacturer's instructions.
- c. Each IDF data rack shall be labeled in 24 point black type on a white field with the rack identification label as shown in rack elevations.
- d. All rack mounting bolts and hardware shall be torqued to manufacturer's specifications.
- e. Data racks, cable tray and other mounting hardware shall be grounded back to the TMGB or TGB per ANSI/TIA/EIA-607 Electrical Grounding of data communications systems and as shown on the drawings.

3. CLASSROOMS

- a. Install IMI Data Product Cabinet (IMI), drawing 100499, at designated locations.
- b. Install two (2) two inch (2") conduit sleeves to above ceiling.
- c. Conduit ends shall have protective bushings installed before cables are installed.
- d. IMI cabinets shall be bonded back to the TMGB or TGB per ANSI/TIA/EIA-607B Electrical Grounding of data communications systems and as shown on the drawings.

4. CONFINED SPACES

- a. Install wall mounted data racks, when used, in the IDF's.
- b. Wall mounted data racks shall have corner cushions installed on all lower corners.
- c. Wall racks and other mounting hardware shall be grounded back to the TMGB or TGB per ANSI/TIA/EIA-607B Electrical Grounding of data communications systems and as shown on the drawings.

B. CABLE TRAYS / WIRE BASKET TRAYS

- 1. Cable and basket trays shall be installed as shown on plan view and elevation drawings. Contractor shall plan layout so that cross bar alignment allows the use of waterfall kits into vertical wire managers.
- 2. Cable and basket trays shall be installed in accordance with the applicable electrical code and standards. The inside of the cable support system shall be free of burrs, sharp edges or projections that can damage cable insulation. Abrasive supports (e.g., threaded rod) installed within the cable fill area shall have that portion within the tray protected with a smooth, non-scratching covering so that cable can be pulled without physical damage. Installation of telecommunications cables shall not exceed loading requirements.

3. Cable and basket trays shall not be used as walkways or ladders.
4. Exposed cable and basket tray ends shall be protected with rubber caps or have an end closing kit installed.
5. All cable and basket tray sections shall be bonded to adjoining sections with the listed grounding kit. Drill tip screws shall not be used for attachment. No sharp points shall protrude that may damage other cables. Use of paint piercing washers is required between cable tray and bonding jumper.
6. At least one cable or basket tray section shall be bonded to the TMGB, TGB or CBN. Use of paint piercing washers is required between cable tray and bonding jumper.
7. Cable Management Bend Radius Waterfalls kits shall be installed where cables transition from horizontal cable and basket tray to vertical wire management systems.

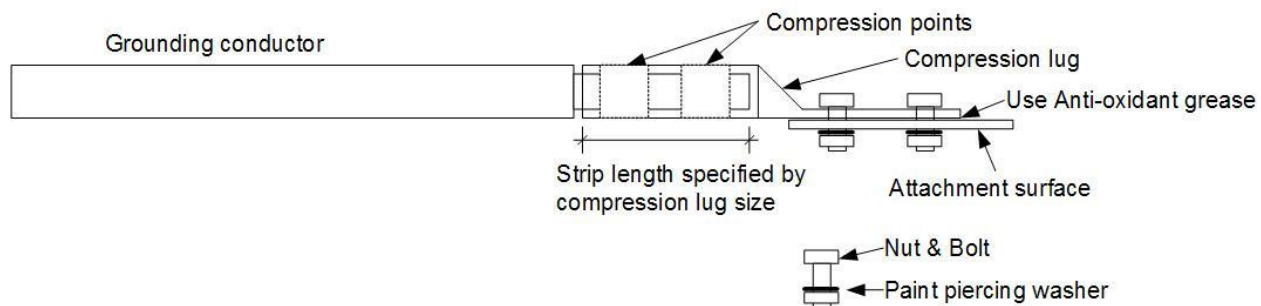
3.04 TELECOMMUNICATIONS GROUNDING & BONDING SYSTEM

This Section specifies the minimum materials and performance standards for grounding and bonding the telecommunications systems installed in the San Ramon Valley Unified School District. Ground all components per manufacturer's requirements and per ANSI/TIA/EIA-J-STD-607-B, TIA-942 or NEC requirements to the TMGB/TGB or CBN located in the MDF or IDF.

- A. The Grounding and Bonding System shall have the following components installed at a minimum. Additional components shall be installed as required for the application requirements.
 1. All Grounding and Bonding components must meet Telcordia NEBS Level 3 and J-STD-607-B requirements.
 2. The completed Telecommunications Grounding and Bonding System is designed to equalize potential across the system, eliminate ground loops and protect against transient voltages.
 3. No TMGB or TGB shall bond directly to the ground buss of an electrical distribution cabinet.
 4. Ground connections at TMGB's, TGB's, CBN, data or cable trays shall have an approved aluminum-to-aluminum, aluminum-to-copper or aluminum-to-steel antioxidant compound applied to the fittings, cable ends and threads of all screws used.
 5. The TMGB in each building shall be Grounded/Bonded to the electrical system single point grounding and earth ground with a #2 THHN GREEN with BLUE tracer stripe Bonding Conductor for Telecommunications (BCT).
 6. All Inter-Building copper backbone trunk cables shall be Grounded/Bonded at both ends to the TMGB or TGB's with a #6 THHN GREEN BC.
 7. Ground protection devices shall be installed as required by code, specified in this document or as shown on drawings.
 8. All TGB's within the same building shall be bonded back to the TMGB with a #2 THHN GREEN BCT.

9. Each Data Rack, Cabinet or other structure in the data system shall be Grounded/Bonded to the TMGB, TGB or CBN in the MDF or IDF's respectively with a #6 THHN GREEN Bonding Conductor (BC).
10. Each rack mounted Rack Ground Strip shall be bonded to the TMGB, TGB or CBN with a #6 THHN GREEN BC. Do not daisy-chain the BC between data racks.
11. Each Cable tray section shall be bonded to other sections with the specified bonding jumper. Use supplied manufacturer's hardware for connections. Use of drill point screws will not be accepted.
12. Cable tray shall be bonded to the TMGB, TGB or CBN with a #6 THHN GREEN BC.
13. All CATV passive equipment including splitters, taps, combiners, notch filter or other connection points shall be bonded to the TMGB, TGB or CBN with a #10 THHN GREEN minimum BC.
14. All CATV Active equipment including amplifiers or other active equipment shall be bonded to the TMGB, TGB or CBN with a #10 THHN GREEN minimum BC.
15. All inter- building copper based communication cables shall be bonded to the TMGB or TGB at each end through the appropriate protection devices or as shown.
16. Grounding conductor terminations (lugs) shall be listed compression type, two-hole, long barrel with window lug with a minimum of (2) crimps. Crimp according to manufacturer's recommendation.

GROUND CONNECTION DETAIL



17. Grounding conductor terminations (HTAP) shall be listed compression type with a minimum of (2) crimps. Crimp according to manufacturer's recommendation.
18. All connections shall be in approved connectors, lugs or taps. No connections shall be made by wrapping the conductor strand around a screw head.
19. Where a bonding conductor passes through a metal conduit, each end of the conduit shall bond to the BCT.
20. No bend shall form an included angle of more than 90 degrees or have a radius of less than six (6) inches.
21. TMGB's and TGB's shall have NEMA bolt-hole sizing and spacing to allow for connection of the two-hole compression lug connectors and other grounding and bonding conductors

22. All connection points shall be properly cleaned and a layer of antioxidant grease applied before installing the lug or connector.
23. Application rated ground protection devices shall be installed on all inter-building cables over 140 feet as specified by NEC.
24. All primary grounding and bonding connection points shall be identified with a Panduit LTYK grounding and bonding label tag that reads “IF THIS CONNECTOR OR CABLE IS LOOSE OR MUST BE REMOVED, PLEASE CALL THE BUILDING TELECOMMUNICATIONS MANAGER”.
25. All grounding and bonding conductors shall have self-laminating labels applied at all connection points identifying the origin and source of the conductor.
26. TGB's within the same building, IDF or closet shall not be connected in a daisy chain fashion back to the TMGB. Each TGB shall bond directly to the TMGB which shall bond to the Single Point Grounding connection.

3.05 CABLE MANAGEMENT

A. VERTICAL

1. Vertical management units shall be installed with front and rear doors or cover panels.
2. Management units with mounting ears shall be mounted with mounting ears secured to the rear of the rack upright post.
3. Cable Management Bend Radius Waterfalls kits shall be installed where cables change direction from a horizontal to vertical plane or lead into rack or vertical wire management.
4. PEV8's shall be mounted with the deeper section mounted to the front of the rack.

B. HORIZONTAL

1. Horizontal management units shall be installed with front and rear doors or cover panels.
2. See MDF and IDF Elevation drawings for installed locations.

C. D-RINGS

1. Six inch (6") D-Rings shall be installed along the top of all communications backboards mounted in the room.
2. D-Rings shall be mounted at twenty-four inch (24") centers.
3. Additional D-Rings shall be installed where cables drop vertically down to terminal boards.
4. D-Rings shall not be used to route Cat 6A data cables. Where data cables are to be run, approved J-hooks shall be installed.

D. DATA J-HOOKS

1. J-hooks shall have a minimum 1" bend radius control.
2. J-hooks shall be sized for the approved number of conductors to be installed.

3. J-hooks shall be spaced no more than 4 feet on center.
4. Use of steel pipe J-hooks is not permitted.
5. Cat 6A cables shall be managed in bundles of 12 cables with no more than 4 bundles per J-Hook.

E. WIRE TIES

1. Cinching type plastic 'Zip-ties' shall not be used to secure or manage any data cabling.
2. Use Panduit Tak-Ty or Hook & Loop type Velcro tape to secure or manage cables.

F. WATERFALLS

1. Waterfall kits shall be installed at all horizontal cable runway to vertical wire management system transitions to maintain bend radius.
2. Conduit waterfalls shall be used on horizontal conduit ends or wall stubs when the cable count is greater than 20 cables.

3.06 NETWORK HARDWARE

MDF and IDF NETWORK HARDWARE

1. Networking equipment shall be acquired and delivered, installed and/or configured as specified in **Section 8**.

No substitutions allowed without specific written permission of District Technology Project Manager only, District has standardized on Panduit, Cisco and Liebert district-wide and will not generally substitute for these components because of operational, training and support issues

3.07 FIBER OPTICS

A. FIBER OPTIC CABLE

1. Install one single mode data distribution fiber optic cable (12 strand as specified) from the MDF to each IDF rack or cabinet location as specified in the Fiber-Phone-CATV-Speaker cable schedule in the drawings
2. All Pre-Terminated fiber optic cable endfaces and connector ports shall be cleaned with manufacturer specified cleaning products prior to connection. Failure to do so may result in testing failures. Cables or connector panels that fail shall be replaced at contractor expense as cables and connectors come pre-certified from the factory.
3. Cable routes must be field engineered and approved by the District Technology Project Manager to avoid obstruction of other facilities.
4. Unless otherwise specified, multimode and single-mode fiber cable must meet the transmission performance parameters as specified in ANSI/TIA/EIA-568-C.3. Multimode fiber shall have core/cladding dimensions of 62.5/125, 50/125 and Single mode fiber shall have a core/cladding dimension of 8.2/125 microns.

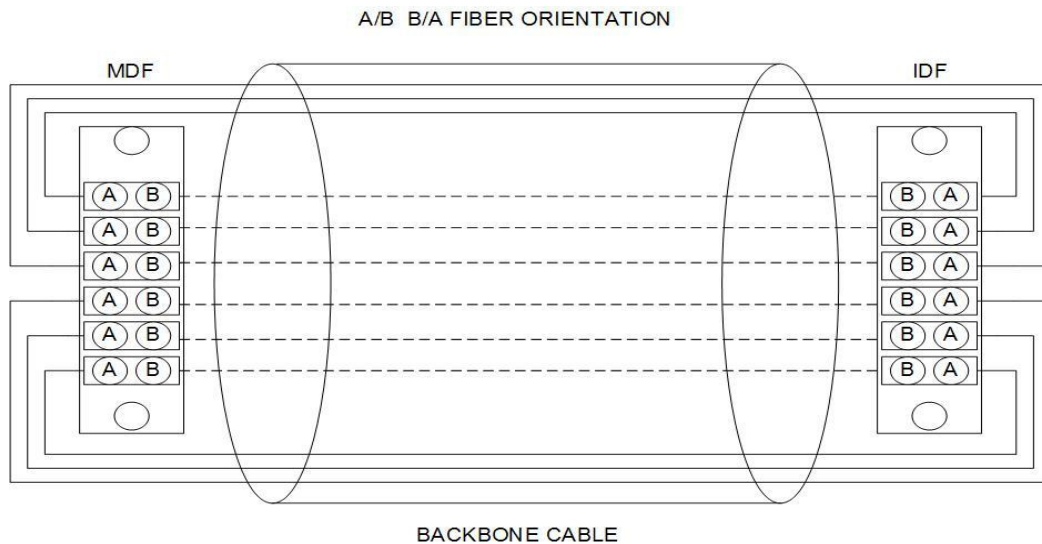
5. Where new cable plant is being installed at a campus, 8.2 Micron Single mode fiber shall be installed as specified.
6. All fiber optic cables shall have continuous sheath continuity.
7. Each cable shall be identified with a pre-established uniform numbering system. Identification shall be securely attached to the cable at each end, whenever it enters or leaves a conduit, and at MDF and IDF ends. Labels shall be machine generated, self-laminating with a clear wrap. Labels shall be in 10 point Black type on a WHITE background. All labeling schemes must be approved by the District Technology Project Manager.
8. Fiber optic cables must be installed in innerduct at the point where they exit the conduits or trays at the MDF and IDF, in ground boxes or other openings where the cable might be damaged.
9. Provide a 20-foot service loop at the end of each fiber optic cable prior to termination.
10. Use only approved water blocking compound remover on gel-filled cables.
11. Fiber optic cables shall only be installed in fully completed MDF or IDF rooms. Cables shall not be pulled in, terminated and left "bagged" for future installation in the FDC.
12. When installing Panduit MTP Pre-Terminated fiber optic cable, cassettes at the MDF are configure straight through (*****AS series) and pair flipped at the IDF end (*****AS series).
13. Connector endfaces shall show a core finish that is 100 percent (100%) free of scratches, chips and defects when viewed at 250x magnification for multimode and 400x for single mode.
14. Connector endfaces shall show a cladding that is 100 percent (100%) free of scratches, chips and defects when viewed at 250x magnification for multimode and 400x for single mode.

B. CONNECTORS

1. Use Beige colored SC connectors for all 62.5 micron fibers.
2. Use Aqua colored LC Laser Optimized connectors for all 50.0 micron fibers.
3. Use Blue colored LC connectors for all 8.2 micron single mode fibers.
4. Connectors shall be installed per manufacturer's installation instructions.
5. End faces shall be polished using manufacturer polishing procedures.
6. Connectors shall be cleaned and dried prior to insertion into the connector panels.
7. All protective fiber connector panel caps shall be installed.
8. Plastic type fiber connectors shall not be used.
9. Use specified fiber cassettes when installing MPO fiber.

C. FIBER DISTRIBUTION CABINETS – FDC'S (patch panels)

1. FDC's shall be rack-mounted on the equipment racks at position(s) shown on MDF and IDF elevation drawings.
2. All fibers and connector panels shall be clearly identified as to orientation and number, IDF being served and other information as required. Labels shall be machine generated in 12 point black type on a white field centered over each jack.
3. All fibers shall be routed and secured in the split wire loom supplied in the mounting kit.
4. FLEX1U or FLEX4U cabinets and supporting FLEX-PLATE* with MTP cassettes shall be used with Pre-Terminated fiber.
5. When installing fibers in a FRME1U or FRME2U Distribution Cabinet, fibers shall be protected from damage in the tray slot or protrusions by use of split wire loom supplied in the FRME mounting kit.
6. Fiber optic connectors shall be oriented **B-A** in the IDF's.



3.08 UTP DATA CABLING

A. UTP STATION CABLE

1. Each building's Permanent Link data cabling shall be run in a star configuration, direct from the building MDF or IDF rack mounted patch panel to each individual station termination unbroken and un-spliced.
2. All Category 6A Permanent Link cables shall be installed in surface raceways, in steel conduits as called for in the drawings, whenever they penetrate an above-ceiling wall or when they are in non-habitable space as detailed on drawings.
3. Category 6A Permanent Links shall not exceed 297 feet / 90 meters in electrical length from the termination at the Work Area Outlet to the termination at the IDF.
4. Category 6A Permanent Links shall enter patch panels from the rear.

5. Provide permanent machine generated self-laminating labels in black 10 point type on a white field with a clear wrap no more than 2" from each end of the cable jacket. Each cable shall be identified by room number or location being served.
6. Permanent Link cables shall not be tightly bundled or combed together per EIA/TIA 568C.1-3. The cabling contractor shall use Panduit Tak-Ty Tape wraps to support or secure cables so that the cable jacket is not deformed in any way. Plastic tie wraps shall not be used.

B. CABLE ROUTING

1. Where cables are installed in conduits, wall sleeves or other raceway, pathway shall be filled no more than 60% percent.
2. When Category 6A Permanent Link cables run "free air," all station cables shall be suspended by Category 6A -compliant "J hooks" spaced no more than four (4) feet apart attached above the drop ceiling per EIA/TIA 568C.1-3 or building code. Each cable bundle shall be no larger than 12 cables per bundle and no more than 4 bundles when installed in J-Hooks.
3. Audio/visual cables, speaker cables and Category 5e telephone cables may be run with Category 6A data cables in any conduits or pathways herein. Do not exceed the fill limits as stated in B.1 and 2.
4. Category 6A service loops at each end shall be installed in a figure 8 pattern. Service loops shall not be installed in a coiled loop fashion.
5. At each station faceplate, when closing up and securing faceplate to the wall or mounting surface, cable slack shall be pulled back to the nearest point where the service loop is managed. Box stuffing is not permitted.

C. JACKS

1. Terminate all pairs of the station cable in modular jacks.
2. Panduit termination procedures are to be followed.
3. Terminations on the jack shall fully conform to Panduit's latest wiring requirements for CAT 6A jacks. The contractor shall replace any termination not passing the required communications test at any cost to the District.
4. Jacks shall be oriented on the patch panels such that the rooms are placed in finished room numerical order starting at the top left, and proceeding in a left to right, top to bottom order.
5. The Yellow data jack shall always be the last jack for each classroom on the patch panel. In office spaces or other non-classroom spaces, use numbering and positions as indicated on drawings. Where it is uncertain as to orientation, Contractor shall verify with the District Technology Project Manager prior to installation, the numbering scheme. See Standard Typical Classroom Patch Panel layout drawing for details.

D. CATEGORY 6A UTP PATCH PANELS

1. Patch panels (Panduit- CPPLA24WBLY, CPPLA48WBLY, CP24BLY) shall be all steel, modular jack and rack mounted on the equipment racks. Install the specific patch panel as specified on the MDF and IDF Elevation Drawings.

2. Terminations shall be performed per the latest vendor procedures for terminating station cable on Panduit MiniCom modular Category 6A data jacks. Cable jacket shall be fully seated in the connector body with strain relief clamp engaged. Cables failing this requirement observed during an inspection shall be re-terminated and tested at no cost to the District.
3. Label each patch panel termination with the jack number showing **final occupied** room number and port number (ex. 301-01, 301-02...). See Typical Classroom Patch Panel Layout for numbering example. Contractor shall submit final numbering scheme and order for approval by the District Technology Project Manager.
4. Labels shall be machine generated in 10 point black type on a white field centered over each jack.

E. FACEPLATES

1. Refer to Faceplate Port Configuration Types for Faceplate Type and configuration. Provide permanent machine generated labels in 10 point black type on a white field on the front of each faceplate. Label shall show room number and port number (ex. 301-01). Labels shall be installed in faceplate label fields and covered with a clear plastic cover. See Typical Classroom Patch Panel Layout on drawings for numbering examples.
2. Faceplates shall be mounted level and secure to the mounting surface.
3. Where faceplates are to mount horizontally, use appropriate sloped front horizontal faceplates.

3.09 MULTI-PAIR UTP CABLE

A. INSIDE

1. All cables shall be rated for the environment they are installed in.

B. OUTSIDE

1. All cables shall be rated for the environment they are installed in.
2. All outdoor or underground cables shall have a polyethylene jacket and be filled with a flooding compound.
3. In general, a 4 pair count cable running to each IDF from the MPOE shall be installed.
4. MPR and gymnasium buildings shall have a twenty-five pair cable installed from the MPOE.
5. Metallic shields shall be bonded to the TMGB/TGB at each end with manufacturer approved bonding connectors.

C. TERMINATIONS

1. All UTP cabling shall terminate on a Building Entrance Terminal (BET) with integrated 66 Block termination fields and fuses installed for each available pair. See Section 2.10 P 1-4.
2. Install the required 66M punch down blocks mounted on quarter Blue Boards connected back to the BET as required.

3. Locate 66 blocks in the MDF adjacent to MPOE or as shown on MDF plan view drawing.
4. Locate 66 blocks adjacent to rack(s) in each IDF or as shown on plan view drawings.

3.10 CATV SYSTEMS

A. COMPONENTS

1. All active and passive components shall be securely mounted to room backboards.
2. All components shall be connected to the TMGB, TGB or CBN.

B. COAXIAL CABLES

1. DISTRIBUTION CABLES

- a. Install one coaxial backbone cable from the head end, generally located in the MDF, to each building IDF distribution amplifier or splitter, including terminations at each end.
- b. Provide ten (10) feet of service loop at each end.
 1. 625 hardline cables shall be installed in three (3") inch minimum sized conduit with 36 inch bend radiuses.
 2. Cable ends shall be terminated and secured to the wall or active equipment as required.

3.11 PROJECTION AND AUDIO SYSTEM(S)

The following vendor may be contacted for AV equipment and cables specified.

Adam Wisot
Troxell Communications
Adam Wisot
669-333-6674

The following components, where called out, shall be installed under this contract.

A. GENERAL REQUIREMENTS

1. All audio-video cables manufacturers shall be as specified in the projection system detail drawings. No substitutes are allowed.
2. Cabling shall be installed to achieve the shortest possible pathway but no greater than 31 feet.
3. Ceiling mounted projector to be installed with the centerline offset three (3) inches to the left of the projection screen centerline. It is recommended that the projector mount be installed before the projection screen to allow for exact alignment to ceiling grid, light or fixture adjustments.
4. The Chief CMS-440 mounting tray has pre-cut opening for 1 and 2 gang electrical junction boxes. Install quad electrical outlet in the 2-gang opening.

5. Where electrical junction boxes are installed in the ceiling tray, boxes shall extend through the ceiling tile such that the box is flush with the finished ceiling tile.
6. Where mounting the receptacle in the ceiling tile next to the projector mount, use a Caddy #512 Box Hanger.
7. In a classroom installation where movie screens are to be mounted, projector ceiling mounts shall be placed according to the following screen size table. Distance shall be measured from the face of the projection screen to the face of the projector.

Screen Size in width	Distance out from screen
6 foot	10 feet
7 foot	12 feet
8 foot	13 feet

4. **Contractor shall verify all mounting dimensions with the District Technology Project Manager prior to installation of the projector mount or projection screen.**

B. FLAT T-BAR CEILINGS

2. Install one (1) Chief Manufacturing CMS-440 series ceiling mounted tray adapter per manufacturer installation instructions where shown on plans.
3. Install one Racco #561 gangable J-box with two (2) duplex 110V 20A outlet in one of two knockouts provided on the adapter. Attach J-box to CMS-440 tray with pop rivets.
4. Install one Racco #561 gangable J-box for data cable and jack in second knockout. Attach J-box to CMS-440 tray with pop rivets.
5. Install one (1) 1-1/2" x 5" nipple through ceiling tile to accept projector mount and amplifier when installed.
6. Install video cables through the 1-1/2" nipple. Leave two and one half (2-1/2) feet of cable slack accessible.

C. SLOPED T-BAR CEILINGS

1. Install one (1) Chief Manufacturing CMA-365 Truss Mount Adapter in sloped ceilings per manufacturer installation instructions where shown on plans.
2. Install a 1-1/2" one-piece, electrical rigid conduit cut and threaded to required length in the CMA-365 adapter and extended down through ceiling to +11'-0" AFF. Exposed section of pipe shall be painted flat black in color.
3. Install one (1) Chief Manufacturing CMA-340 series Anti-sway adapter to pipe per manufacturer installation instructions where required or shown on plans.
4. Feed all video and audio cables through the 1-1/2" downtube. Leave two and one half (2-1/2) feet of cable slack accessible at the projector end.
5. Optional mounting method if structural members permit. Install 1-1/2" unistrut at top side and bottom side of beam and secure 1-1/2" downtube with strut clamps. Each Strut channel must be secured in two places with a minimum 3/8" by 3" lag bolt.

D. SOLID CEILING SURFACE OR BEAMS

1. Install one (1) Chief Manufacturing CMA-110 series adapter at all solid ceiling mount locations per manufacturer installation instructions. Use 3/8" by 4" lag bolt or a length to achieve 3" embedment into solid material.

E. WALL MOUNTS

1. Install one (1) Chief Manufacturing WM220S projector mount at all wall mount locations per manufacturer installation instructions. Use 3/8" by 4" lag bolt or a length to achieve 3" embedment into solid material. See Elevation Detail Drawing.
2. At the MPR projector location, install two (2) two-gang J-boxes six inches (6") above the mount centerline, one for a 110V 20A dedicated quad power receptacle. Install the second 2-gang deep J-box with a two gang mud ring centerline the WM2200S mount for video control cables. The two gang box shall have two- 1-1/2" conduits installed back to the AV1 J-box at the multi-media cabinet. See projection conduit plan and elevation drawing for location detail. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
3. At the Library projector location, install a one-gang J-box six inches (6") to the right of the mount centerline for a 110V 20A dedicated quad power receptacle. Install a 4 square deep J-box with a two gang mud ring centerline and 6" above the WM2* mount for video control cables. The 4 square box shall have a 1-1/2" conduit installed back to the AV1 J-box at the multi-media cabinet. See projection conduit plan and elevation drawing for location detail. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
4. Projector mount is to be installed to the centerline of the projection screen.

F. AUDIO VISUAL EQUIPMENT CABINETS.

1. Where shown, install one (1) Middle Atlantic series DWR-12-22 equipment cabinet with PFD-12 front door at the designated projection system location. Cabinet shall be set with backpan 12"x12" cutout centered over flush mounted 12"x12"x6" J-box in wall. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
2. Where shown, install one (1) Middle Atlantic series SR-40-22 equipment cabinet with FD-40 front door at the designated projection system location. Cabinet shall be set with backpan 12"x12" cutout centered over flush mounted 12"x12"x6" J-box in wall. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
3. Where shown, install one (1) Middle Atlantic series WR-44-32 equipment cabinet with WRFD-44 solid front door at designated audio visual equipment location. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
4. Where shown, install one (1) Middle Atlantic series WR-24-32 equipment cabinet with WR-24 solid front door at designated audio visual equipment location. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.
5. Where shown, install one (1) Middle Atlantic series ISRK Under Desk equipment cabinet at designated audio visual equipment location. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.

6. Where shown, install one (1) IMI #100499 SRVUSD custom data cabinet at designated audio visual equipment location. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.

G. SPEAKER OUTLETS.

1. In the MPR and Library installation, speaker outlets shall be installed on top of a 4x12 block installed for backing. Install necessary solid wood shims to bring flush with the finished wall surface. See detail drawings.

H. OTHER PROJECTION SYSTEM J-BOXES

1. J-boxes shall be installed as shown on drawings and Projection System Conduit Single Line details. Where it is uncertain as to location, Contractor shall verify with the District Technology Project Manager prior to installation.

3.12 AUDIO SYSTEMS

A. Cabling, mounts and cabinets.

1. Contractor shall install specified audio visual cables per the schedule of AV cables shown on drawings. Locations include but are not limited to classroom ceiling projector locations, library, MPR or theater projection systems, MPR audio systems, projection system audio cabling.
2. All connectors shall be installed according to the detail shown where specified.
3. Contractor shall install all specified AV cabinets including all conduit and power to the cabinets.

3.13 IP CLOCK AND SPEAKER SYSTEMS

- A. The District is now installing IP Clock Speakers (IPCS), IP Speakers (IPS) or IP Zone Speaker (IPZS) systems. The District will furnish to the contractor for contractor installation (OFCI), the required IP Clock Speaker, IP Speaker or IP Zone speaker backboxes. The contractor shall be responsible for installation of the speaker backboxes at all locations. Contractor shall verify with the District Technology Project Manager at the time of backbox installation the locations and types of backboxes to be installed. Contractor shall furnish all connectors, mounting hardware, conduits, required cables (Cat 6A or Zone cable), terminations and other components as required to complete the installation. The District will program the IPCS, IPS or IPZC speaker at each location. Devices, once configured are location specific and must be installed in the correct location.

1. Contractor shall install at each speaker location shown on the plans, the required backbox and necessary conduit to accessible ceiling space or conduit to the MDF or IDF.
 - a. Inside classrooms, office spaces, MPR, library or locations where an IPCS is to be installed, the backbox shall be installed at the specified location and height. Boxes shall be set such that they are flush with the finished wall surface.
 - b. Outside wall mount IPS or IPZS speakers shall be installed at the specified location, height and set flush with the finished wall. Any required sealing or flashing shall be installed by the contractor around the opening to provide a weatherproof seal to the backbox.
 - c. Hallway, ceiling or walkway backboxes and mounting adapters shall be installed at the specified locations flush with the finished surface.

- d. Where speakers are to be surface mounted, backboxes shall be mounted over a flush mounted one-gang j-box in the wall with a one inch (1") conduit stubbed to free air ceiling space or continuous conduit to the MDF or IDF.
2. Contractor shall install and terminate a Category 6A data cable from the MDF or IDF to each IPCS or IPS. Data jacks shall be installed on the specified patch panels as shown on the MDF and IDF rack elevation drawings.
 - a. At the IPCS or IPS end, contractor shall install and terminate a FP6X88MTG FTP on the Cat 6A cable. Cable shall be routed such that installation of the speaker by the District is not impeded upon.
 - b. At the patch panel end, terminate and install a CJ6X88TGVL data jack on the designated patch panel.
 - c. Contractor shall install a Belden 5200UE cable from the MDF or IDF to each wall mounted zone speaker. At the speaker end, each wire shall have a # 8 stud sized nylon insulated fork terminal attached. All terminations and splices shall be made by nylon insulated compression type connectors. Each cable shall terminate in the MDF or IDF on a screw type barrier terminal strip on one side. Paired jumpers shall connect on the other side with a single cable installed to the zone amplifier location on the rack. See MDF/IDF Elevation Detail Drawing. Leave five feet (5') of slack at the zone amplifier location and two feet (2') of slack at the wall speaker.
 - d. Hallway, ceiling or walkway zone speakers shall be connected in a daisy-chain pattern from the MDF or IDF. Where cables route in inaccessible hallway, ceiling or walkway spaces, each backbox shall be connected to the next with a one inch (1") conduit. This conduit shall originate in the MDF or IDF.
 - e. Daisy-chained ceiling ZONE speakers shall be cabled with a Belden 5200UE. This cable shall run from speaker to speaker back to the MDF or IDF zone amplifier. The cable shall enter each backbox and be paired to the cable leaving the backbox. At this connection point, a twenty-four inch (24") pigtail of the same gauge and color shall be attached. One end of each pigtail shall have a # 8 stud sized nylon insulated fork terminal attached. All terminations and splices shall be made by nylon insulated compression type connectors. Leave five feet (5') of slack at the zone amplifier location. No more than ten (10) speakers shall be daisy-chained.
 - f. Each IPCS or IPS Cat 6A cable shall be tested as though it were a standard Category 6A data drop. See Section 4.0 for full testing requirements.
 - g. Each zone speaker cable shall be checked for continuity end to end.
 - h. All cables ends shall be labeled. See Section 5.0 for additional requirements.
 - i. When installing ZONE speakers, the transformer tap shall be set at 2 watts unless noted or requested.

B. SPEAKER TYPES

The following speaker identifications shall be used on the plans and elsewhere as required to denote the speaker types to be installed.

SPEAKER TYPE	BACKBOX PART #	SPEAKER PART #	SPEAKER GRILL PART #	IP CLOCK SPEAKER
S1	SEST-I8SC			I8SCM+
S2	FEST-I8SC			I8SCM+
S3	SEST-IH	APF15T	VP161A-APF	
S4	FEST-IH	APF15T	VP161A-APF	
S5	SE175-4	SD72	161-8	
S6	198-8	SD-72	161-8	
S7		EZHD72W		
S8	96-8	SD72	62-8	
S9	96-8	SD72	VP60-R	
AVS1		EZHD72W		
AVS2		SM52TW		

- S1- Surface Mount, interior IP Clock Speaker
- S2- Flush Mount, interior IP Clock Speaker
- S3- Surface Mount, Exterior Zone Speaker
- S4- Flush Mount, Exterior Zone Speaker
- S5- Surface Mount, Interior Zone Speaker
- S6- Flush Mount, Interior Zone Speaker
- S7- Interior T-Bar Ceiling Zone Speaker
- S8- Interior Hardlid Zone Speaker
- S9- Interior Hardlid Zone Speaker, Vandal Proof Grill
- AVS1- Projection System T-Bar Ceiling Speaker
- AVS2- Projection System Surface Mount Speaker

SECTION 4- FIBER OPTIC, CATEGORY 6A, UTP PHONE, AUDIO VISUAL, SPEAKER AND COAXIAL CABLE TESTING

4.01 GENERAL

- A. Provide all labor, materials, and tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.
- B. Test limits and testing requirements in effect at the time of installation and as specified by TIA/EIA and or the manufacturer shall be used when performing testing.
- C. Testing and Certification shall be carried out in accordance with this document.
- D. All testing must be completed with approved test equipment as listed in Section 4.03 below.
- E. All Fiber Optic Testing shall be completed with new, unused Reference Grade Test Reference Cables (TRC's). Cables shall be continuously cleaned when moving from location to location.

- F. All system connectors, sleeves, and jumpers must be properly cleaned and installed into devices before measurements are taken.
- G. Certification testing shall be performed on each fiber, copper or coaxial cabling segment (connector to connector) after final installation in the faceplate, patch panel or connector panel.
- H. All test results must be submitted to and approved by the District Technology Project Manager prior to submittal to Panduit Corporation or Corning Cable for Warranty. One Hundred Percent (100%) of the installed cables, as adjusted up or down by Change Order, must PASS.
- I. Submitting of falsified or pre close-up certification reports, as determined by the District Technology Project Manager, shall require 100% percent complete system retesting by a third party vendor of the District's choice or with the Districts representative present and the cost, including the time of the District representative, shall be borne by the installation contractor.
- J. Test results shall be submitted in their native .FLW Fluke LinkWare file format, with viewing software provided, for review by the District. Test results shall be sorted and organized by building, by cable type and in numerical order. Results shall be submitted to the District Technology Project Manager within Five (5) working days of the test either by building or project.
- K. Testing of all installed Fiber Optic, Copper, Twisted Pair, Audio Visual, speaker and Coaxial cable infrastructure shall be completed as specified below and shall be completed prior to phase completion or occupancy. District Technology Project Manager reserves the right to be present during all final network testing, a minimum of 48 hours' notice is required for testing during work hours (7:00 AM to 4:00 PM, Monday through Friday, District and legal holidays excepted).
- L. Testing includes VFL polarity testing and attenuation testing of the installed Fiber Optic cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain Reflectometer (OTDR). The condition of the fiber endfaces at both ends shall be verified and end face images recorded. See Section 3.07A 13 & 14. Fiber reports shall be combined in Fluke LinkWare to include the OLTS, OTDR and endface images in a single report.
- M. Because of the cooperation required between contractor and District integrating the new CATV systems with the existing campus systems (if applicable), District and contractor must mutually agree to times and dates where final integration, testing, and tuning will be performed. Contractor shall propose times and dates giving seven (7) days minimum notice to District of intention to coordinate with District. District shall not unreasonably withhold approval of contractor's proposed dates.
- N. In addition, testing shall be performed on any cabling link, whether fiber, copper or coaxial, that is identified by the District Technology Project Manager.
- O. Where the contractor is required by these specifications to re-test any installed cabling and the network is in use, testing shall be conducted after hours with a District representative present. Cost of any re-testing including the cost of the District representative shall be borne by the installation contractor.
- P. All re-testing shall be done with a District representative present.
- Q. All active network cabling is port and VLAN specific. Connections must be restored to this specific order for systems to operate. Contractor will be back charged for District time spent in restoring disrupted connections caused by testing or repair.
- R. The District Technology Project Manager will select a random sample of 40% of the installed fiber, Category 6A, coaxial, audio-visual and twisted pair links. The District Technology Project Manager

shall test these randomly selected links and the results are to be stored. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the District representative shall repeat 100% testing and the cost, including the time of the District representative, shall be borne by the installation contractor. In addition, the random selected fiber optic links shall be visually inspected for endface termination quality and cleanliness.

- S. Care must be taken to insure that no Cat 6A data cable or Fiber Optic cable is subject to being painted, coatings applied to the outer jacket or other such disturbance as to void the cabling warranty. Manufacturers specifically prohibit such coatings. Where an area is to be painted, all cables must be wrapped with protective plastic sheeting to prevent any overspray.

- T. CATEGORY 6A DATA CABLE

- 1. All Category 6A testing shall be performed using the Permanent Link test. Tests which result in a FAIL, *FAIL or *PASS shall be considered as a FAILURE. Those cables that result in a FAILURE shall be repaired or replaced at no additional cost to the District. Repaired or replaced cables shall be re-tested and must meet the above criterion.
 - 2. All Category 6A data testing shall, at a minimum, be in accordance to TIA/EIA 568 C.2.1 industry specifications herein or applicable requirements at the time of testing and in all cases shall support 350 MHz transmissions end to end over all data circuits. All testing shall be completed with approved testers. *PASS drops shall be repaired or replaced to achieve a PASS test result. See Section 4.06 for complete testing specifications.

- U. FIBER OPTIC CABLE

- 1. Prior to installation, all Fiber Optic Cable shall have an “on the reel” acceptance test performed using an OTDR.
 - a. Each fiber on every reel shall be checked with an OTDR at both 850nm and 1300nm for multimode and 1350nm and 1500nm for single mode to verify fiber lengths and to identify point discontinuities.
 - b. The contractor shall be responsible for resolution all discrepancies found before or after the cable is installed.
 - c. The contractor shall record the date, operator, test equipment and serial number for the above tests. Results shall be submitted to the District Technology Project Manager prior to installation on the project.
 - d. Link test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated. See Section 4.04 A .11.
 - e. Multimode fiber endfaces shall be inspected at 250X or 400 X magnifications. 250X magnification is suitable for inspecting multimode fibers. 400X magnification shall be used for detailed examination of either SM endfaces.
 - f. All fiber optic loss testing must include full bi-directional testing methodology for all strands of fiber with success ratings relative to the manufacturer’s published loss budget for all components and distances involved. Specifically, a loss budget (sum of allowable loss for each connector and the dB loss per foot of the installed fiber run) shall be calculated, either manually or by the test equipment employed. Applicable TIA/EIA 526-14B and TSB 140 standards shall be adhered

to. Mode conditioning mandrels of the correct size shall be used. See Section 4.04B for complete testing specifications.

- g. Prior to Optical Time Domain Reflectometry Testing (OTDR) and Optical Loss Testing (OLTS), the contractor shall verify the continuity, polarity and integrity of the installation with a Visual Fault Locator (VFL).
- h. After successful VFL inspection and before OTDR qualification, the contractor shall proceed with End Face Image capture and recording. All connector end faces shall be free of all dirt and residue. End faces showing chips, scratches or other defects shall be repaired and re-checked prior to OTDR testing.
- i. Upon completion of End Face Image Capture, the contractor shall complete OTDR qualification and record the results. Traces that exhibit "Negative Loss", "Ghosts", "Gainers", connectors showing a loss above .75dB for 62.5 Micron MM fiber and .5dB for 50 Micron LO MM Fiber and splices above 0.3dB shall be repaired, re-checked with the VFL and a new End Face Image taken. A new trace shall be taken of the fiber and stored.
- j. After successful completion of all OTDR qualifications, OLTS shall commence. All results shall be recorded.

V. COAXIAL CABLE

- 1. All Coaxial cables shall be checked for shorts, kinks or other deformities using a coaxial cable tester.

W. AUDIO VISUAL CABLES

- 1. Audio cables which have had field connectors installed shall be checked for shield, short, polarity and continuity faults.
- 2. Video cables shall be checked for continuity faults.
- 3. Test results shall be submitted for approval by the District Technology Project Manager.

4.02. QUALITY ASSURANCE

- A. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:
 - 1. Manufacturer of the fiber optic cable and/or the fiber optic connectors.
 - 2. Manufacturer of the test equipment used for the field certification.
 - 3. Training organizations (e.g., BICSI, A Telecommunications Association headquarters in Tampa, Florida; ACP [Association of Cabling Professionals™] Cabling Business Institute located in Dallas, Texas).
- B. Submitting of pre-test, erroneous or falsified certification reports, as determined by the District Technology Project Manager, shall require 100% percent complete system retesting by a third party vendor of the District's choice or with the Districts representative present and the cost, including the time of the District representative, paid for by the installation contractor

4.03. TEST EQUIPMENT: Test equipment shall meet or exceed the Level IV test equipment requirements as specified in TIA/EIA-568-C.2-1, Annex B, B-1 and elsewhere. Tester shall be within the current Calibration Period as certified by the manufacturer.

- A. Field-test instruments shall have the latest software and firmware installed.
- B. The field-test instrument shall be within the calibration period recommended by the manufacturer. Current calibration certificate shall be provided to the District Technology Project Manager or its assignee at the time of testing.
- C. Fiber and Category 6A test reports shall be submitted in native Fluke LinkWare (.flw) reporting software format.
- E. Test equipment shall have the required test leads, mandrels and other required accessories to complete the required testing.

F. APPROVED FIBER OPTIC TESTERS

- 1. Fluke DTX 1800M.
The correct fiber test leads and conditioning mandrels must be used. Tester must be calibrated for Method B 1 Jumper reference using the correct LC, SC or ST fiber port adapters on the receive Input and conditioning mandrels on the Output.
- 2. Fluke OptiFiber OF-500-xx OTDR with and Launch/Receive fiber and the Fiber Inspector.
- 3. Fluke DSX-5000QOi Versiv series testers with the appropriate fiber MM or SM modules.

G. APPROVED CATEGORY 6A CABLE TESTERS

- 1. Fluke DTX 1800 with PLA002 Permanent Link Adapters.
- 2. Fluke DSX-5000QOi Versiv series testers with the appropriate copper and fiber modules.

H. FLUKE KNOWLEDGE BASE

- 1. Refer to the Fluke Networks Knowledge Base website for information on correct setup and testing procedures.
- 2. Refer to the Fluke Networks Knowledge Base article “ANSI/TIA-568C testing LC to LC (Duplex Multimode) DTX-MFM2” or “ANSI/TIA-568C testing LC to LC (Duplex Single mode) DTX-SFM2” for correct setup when testing fiber optic cables.

4.04 FIBER OPTIC CABLE TESTING

A. WORK INCLUDED

- 1. The District Technology Project Manager must be notified two (2) days in advance of any fiber testing and must be present during initial setup.
- 2. All installed fiber optical connectors and connector ports shall be cleaned and dried prior to any testing.
- 3. All fiber test reference cords (TRC's) used for OLTS and OTDR testing shall be cleaned and dried prior to use to prevent cross contamination. All TRC's shall have less than .20dB loss. TRC's must be ISO/IEC 14763-3 compliant.

4. Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in this Specification.
5. In order to conform to the overall project event schedule, the installation contractor shall survey the work areas and coordinate cabling testing with other applicable trades.
6. In addition to the tests detailed in this document, the contractor shall notify the District Technology Project Manager of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.
7. Each fiber shall be checked for end-to-end attenuation using an OLTS after the fiber has been terminated and installed into the fiber distribution cabinet. Multimode fibers shall be checked at both 850 nm and 1300 nm bi-directionally. Single mode fibers shall be checked at both 1310 nm and 1500nm bi-directionally. Test limits shall be as prescribed by TIA/EIA 568-C3.1- 492AAAC and IEEE for Gigabit or 10 Gigabit at the time of installation. Gigabit Fibers shall exhibit loss of no more than 3.5dB/Km at 850nm and 1.5 dB/Km at 1300 nm. 10 Gigabit Fibers shall exhibit loss of no more than 2.6dB total at 1310nm and 1550nm.
8. Test reference cords must be of the same fiber core size and connector type as the cable system.
9. Test reference cords shall be setup per **Method B, 1 Jumper** as detailed by Fluke Networks.
10. Mode conditioning mandrels of the correct fiber core size shall be used when using an OLTS with LED light sources.
11. Links must be fully installed and completed in all devices before performing final tests. Pre-test reports will not be accepted as the final report.
12. All installed cabling links shall be field-tested and pass the test requirements and analysis as described. Any link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link meets performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation.
13. When using a separate OLTS and OTDR, fiber identifiers recorded shall be the same in both test sets permitting the merging of the two files into one LinkWare report. This includes End Face images.
14. 100% of all fiber links must yield a passing result. Any link that fails shall be repaired or replaced and retested by the contractor.
15. All testing procedures and field-test instruments shall comply with applicable requirements of:
 - a. ANSI Z136.2, ANSI for Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources
 - a. ANSI/EIA/TIA-455-50B, Light Launch Conditions for Long-Length Graded-Index Optical Fiber Spectral Attenuation Measurements

- b. ANSI/TIA/EIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR.
- c. ANSI/TIA/EIA-455-60A, Measurement of Fiber or Cable Length Using an OTDR.
- d. ANSI/TIA/EIA-455-61A, Measurement of Fiber or Cable Attenuation Using an OTDR.
- e. ANSI/TIA/EIA-526-7, Optical Power Loss Measurements of Installed Single mode Fiber Cable Plant.
- f. ANSI/TIA-526-14-B, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed cable plant- Multimode attenuation measurement.
- g. ANSI/TIA/EIA-568-C.1, Commercial Building Telecommunications Cabling Standard, Part 1, General Requirements
- h. ANSI/TIA/EIA-568-C.3, Optical Fiber Cabling Components Standard
- i. TIA/EIA TSB-140, Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
- j. ANSI/TIA/EIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements.
- k. ISO/IEC 14763-3 Testing of Fiber Optic Cabling
- l. ISO/IEC 11801
- m. TIA 492CAAB (OS2)
- n. TR/IEC 61282-15 MPO Testing
- o. Testing as required by the manufacturer at the time of installation to meet warranty requirements.

B. MULTIMODE OPTICAL LOSS TEST SET (OLTS) REQUIREMENTS

Encircled Flux Test Reference Cords are required for testing all multi-mode fibers.

- 1. 62.5 micron Multimode fiber light source
 - a. Provide dual LED light sources with central wavelengths of 850 nm (± 30 nm) and 1300 nm (± 20 nm) output power of -20 dBm minimum. The light source shall meet the launch requirements of ANSI/EIA/TIA-455-50B.
 - b. Test jumpers shall be setup per Method B 1 Jumper as detailed by Fluke Networks using replaceable INPUT connectors on the fiber module. This launch condition can be achieved by use of a GRAY external mandrel wrap (as described in clause 11 of ANSI/TIA/EIA-568-C.1) with a Category 1 light source.

- c. OLTS ports and test reference cords shall be cleaned and inspected before each use.
 - d. Meter shall be referenced each day prior to the start of testing.
 - e. All fibers shall be tested bi-directionally at both 850nm and 1300nm.
 - f. Tester shall be within the factory calibration period.
- 2. 50 micron Multimode fiber light source
 - a. Provide dual LED light source at 850 nm and 1300 nm output power of –20 dBm minimum. The light source shall meet the launch requirements of ANSI/EIA/TIA-455-50C.
 - b. Test jumpers shall be setup per Method B 1 Jumper as detailed by Fluke Networks using replaceable INPUT connectors on the fiber module. This launch condition can be achieved by use of a RED external mandrel wrap (as described in clause 11 of ANSI/TIA/EIA-568-C.1) with a Category 1 light source.
 - c. OLTS ports and test reference cords shall be cleaned and inspected before each use.
 - d. Meter shall be referenced each day prior to the start of testing.
 - e. All fibers shall be tested bi-directionally at both 850nm and 1300nm.
 - f. Tester shall be within the factory calibration period.
- C. SINGLE MODE OPTICAL LOSS TEST SET (OLTS)
 - 1. Provide dual Laser light source at 1310 nm and 1550 nm output power of –10 dBm minimum. The light source shall meet the launch requirements of ANSI/EIA/TIA-455-50C.
 - 2. Test jumpers shall be setup per Method B 1 Jumper as detailed by Fluke Networks using replaceable INPUT connectors on the fiber module.
 - 3. Each mated pair of fiber connectors shall be entered as .5dB in the tester setup.
 - 4. New, Factory Sealed Reference Grade TRC's shall be used for this project. Verification of new TRC's shall be provided to the District prior to testing.
 - 5. The test reference cords must demonstrate an insertion loss ≤ 0.25 dB when mated against each other.
 - 6. OLTS ports and test reference cords shall be cleaned and inspected before each use.
 - 7. Meter shall be referenced each day prior to the start of testing.
 - 8. All fibers shall be tested bi-directionally at both 1350nm and 1500nm.
 - 9. Tester shall be within the factory calibration period.

D. OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)

1. Testing shall be performed at wavelengths of 850 nm (± 20 nm) and 1300 nm (± 20 nm) for Multimode and at wavelengths of 1350 nm (± 20 nm) and 1500 nm (± 20 nm) for Single mode.
2. OTDR shall have reference set using a 100 meter launch and receive cord of the same core size and type of the cable being tested.
3. OTDR testing shall be performed using the Loop-Back method from both ends of each fiber strand using a launch and receive/tail cable.
4. OTDR testing is to verify component level compliance and cable discrepancies. For Multimode, no connector shall exhibit more than .75dBm of loss for 62.5 micron fiber and .50dBm loss for 50 micron fiber. No splice shall exhibit more than .05dBm of loss for single mode and multimode.
5. OTDR ports and test reference cords shall be cleaned and inspected before each use.
6. New, Factory Sealed Reference Grade TRC's shall be used for this project. Verification of new TRC's shall be provided to the District prior to testing.
7. OTDR trace and event tables shall be saved.
8. Event deadzones of 1m maximum at 850 nm and 2m maximum at 1300 nm.
9. Attenuation deadzones of 6m maximum at 850 nm and 15m maximum at 1300 nm.
10. Distance range not less than 2000m.
11. Dynamic range at least 10 dB at 850 nm and 1300 nm
12. The OTDR shall employ a CUSTOM TEST LIMIT when testing 10 Gigabit fibers with the following parameters set.
 - a. Verify with District Technology Project Manager at the time of testing limits to be used. Limits shall be based on current requirement for 10G Fiber. Connectors shall be set at .5dB max, splices shall be set at .3dB max, length shall be set for 600 meters max and modal bandwidth (MBW) shall be set according to manufacturer spec.
 - b. Limits used shall be a combination of TIA and IEEE limits as adjusted for length and transmission standards.

E. INTEGRATED OLTS, OTDR AND FIBER MICROSCOPE

Test equipment that combines into one instrument an OLTS, an OTDR and a fiber inspector scope may be used. For the optical loss test, the unit must have main and remote units capable of performing true optical loss testing, not a calculated loss. Unit and test procedure must equal the testing parameters listed in 4.04 B, C & D above.

1. The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA/EIA-568-B.1.
 - a.
$$\text{Link Attenuation (dB)} = \text{Cable Attn (dB)} + \text{Connector Attn (dB)} + \text{Splice Attn (dB)}$$

- b. Cable Attn (dB) = Attenuation Coefficient (dB/km) * Length (Km)
- c. Connector Attn (dB) = number of connector pairs * connector loss (dB)
- d. Maximum allowable connector loss = 0.75 dB for 62.5 micron fiber, 0.5 dB for 50 micron fiber and .3dB for single mode.
- e. Splice Attn (dB) = number of splices * splice loss (dB)
- f. Maximum allowable splice loss = 0.3 dB
- g. Reflective events (connections) shall not exceed 0.75 dB for 62.5 micron fiber and 0.5dB for 50 micron fiber.
- h. Non-reflective events (splices) shall not exceed 0.3 dB.
- i. The values for the Attenuation Coefficient (dB/km) are listed in the following table:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 62.5/125 μm	850	3.5	1300	1.5
Multimode 50/125 μm	850	3.5	1300	1.5
Single-mode (Inside plant)	1310	1.0	1550	1.0
Single-mode (Outside plant)	1310	0.5	1550	0.5

E. MAGNIFIED ENDFACE INSPECTION

- 1. Fibers endfaces shall be inspected at 250X or 400 X magnifications prior to OTDR and OLTS testing. Image picture shall be taken of the endface at each end, saved and submitted with the certification report.
- 2. Fiber connections shall be visually inspected for endface quality.
- 3. Scratched, pitted, shattered or dirty connectors shall be diagnosed and corrected.

4.05. POLARITY TESTING

- A. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with sub-clause 10.3 of ANSI/TIA/EIA-568-C.1. The polarity of the paired duplex fibers shall be verified using a VFL. Any cable found to have the incorrect polarity shall be corrected at no cost to the District.
- B. Fibers at the MDF end shall be oriented **A-B**.
- C. Fibers at the IDF end shall be oriented **B-A**.
- D. Testing shall be performed on each cabling link (connector to connector).

4.06 CATEGORY 6A HORIZONTAL CABLE TESTING

- A. Before cable testing, Contractor shall fully complete each horizontal Permanent Link run. Cables shall be fully terminated, installed in faceplates, installed into patch panels and wall J-boxes or

raceways. Submitted test reports shall be of the **finished installed** Link. Pre-test reports will not be accepted as the final report.

- B. Every cabling link in the installation shall be tested, at a minimum, in accordance with the field test specifications defined in the “*Transmission Performance Specifications for 4-pair 100 Ω Category 6A Cabling*” by the Telecommunications Industry Association (TIA); ANSI/TIA/EIA-568-C.2-1. All testing shall be the Permanent Link test, not a Channel Test. Test limits at the time of installation and/or manufacturer requirements for warranty shall be used in all cases.
- C. 100% of the installed cabling links must be tested and must pass the requirements of the standards mentioned in 1.02 above and as further detailed in this Section. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. A Failing Link is defined as a link that results in a *PASS, *FAIL or FAIL. The final passing result of the tests for all links shall be provided in the test results documentation.
- D. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by the test equipment manufacturer, BICSI or the ACP (Association of Cabling Professionals)
- E. The test equipment (tester) shall comply with the accuracy requirements for the proposed level III field testers as defined in the TIA 568C. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy *plus* adapter contribution) are specified in Table B.2 of Annex B of the TIA 568C.
- F. The tester shall have the latest software revision and be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy. At a minimum, the tester must show factory calibration within the preceding year at the time of the testing.
- G. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the tester has been calibrated within the period recommended by the vendor by submitting a current Calibration Certificate along with the test results. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
- H. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section 4.06C). Any Fail, *Fail or *Pass result yields a FAILURE for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must result in a Pass. All submitted test results will be verified for *PASS, *FAIL or FAIL results.
- I. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the test result is closer to the test limit than the accuracy of the field tester. *Pass results are not considered to be a passing result. The District will not accept a *Pass. Values must meet or exceed those as required by the Panduit Warranty Program. See Section 1.11.
- J. All test results will be sorted by test values in Fluke LinkWare by the District Technology Project Manager. The lowest performing values will become a basis for inspection. The District Technology Project Manager shall select a random sample of 40% of the installed links. These randomly selected links shall be tested and the results are to be stored. The results obtained shall be compared to the

data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the District representative shall repeat 100% testing and the cost, including the time of the District representative, shall be borne by the installation contractor.

- K. The installation contractor shall submit, prior to testing, a copy of their step-by-step cabling test procedures to the District Technology Project Manager for review and approval.
- L. The cabling contractor shall check each piece of test equipment by performing a consistency or reference check on the field tester per the manufacturers' recommendations.
- M. Test equipment shall allow the specific cable, NVP (Nominal Velocity of Propagation) and other parameters to be entered into the Autotest.
- N. For each test, the installation contractor shall record the test equipment serial number, the date and time, the operator's name, the cable identification number and the test results. Results must show all tested limits. Contractor shall then submit this information to the District Technology Project Manager for review and approval in both hard copy and the test device native file format, including viewing software.
- O. Category 6A field testing shall be for the following:
 - 1. **Wire Map**
Wire Map shall report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results shall include the continuity of the shield connection if present.
 - 2. **Length**
The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP ([\[1\]](#)). The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.
 - 3. **Insertion Loss (Attenuation)**
Insertion Loss is a measure of signal loss in the permanent link or channel. The term “Attenuation” has been used to designate “Insertion Loss.” Insertion Loss shall be tested from 1 MHz through 250 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk ratio (ACR) parameter.
Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which this worst case value occurs, and the test limit value at this frequency
 - 4. **NEXT Loss**
Pair-to-pair near-end crosstalk loss (abbreviated as NEXT Loss) shall be tested for each wire pair combination from each end of the link (a total of 12 pair combinations). This parameter is to be measured from 1 through 250 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT Loss measurements shall not exceed the maximum step size defined in the standard as shown in Table 1, column 2.

Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin and the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency. NEXT values shall exceed the minimum PASS level by 5dB minimum.

5. **PSNEXT Loss**

Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link-under-test (a total of 8 results). PSNEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 250 MHz and the step size may not exceed the maximum step size defined in the standard as shown in Table 1, column 2.

Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

6. **ELFEXT Loss, pair-to-pair**

Pair-to-pair FEXT Loss shall be measured for each wire-pair combination from both ends of the link-under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ELFEXT Loss that must be evaluated and reported in the test results. ELFEXT measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ELFEXT is to be measured from 1 through 250 MHz and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size defined in the standard as in Table 1, column 2.

Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

7. **PSELFEXT Loss**

Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields 8 wire-pair combinations. Each wire-pair is evaluated from 1 through 250 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1, column 2.

Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst case margin and the wire pair that exhibits the worst value for PSELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency

8. **Return Loss**

Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured from 1 through 250 MHz in frequency increments that do not exceed the maximum step size defined in the standard as

shown in Table 1, column 2. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

9. **ACR (Attenuation to crosstalk ratio)**

ACR provides an indication of bandwidth for the two wire-pair network applications. ACR is a computed parameter that is analogous to ELFEXT and expresses the signal to noise ratio for a two wire-pair system. This calculation yields 12 combinations – six from each end of the link.

Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case margin and the wire pair combination that exhibits the worst value for ACR. These wire pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

10. **PSACR (Power Sum Attenuation to crosstalk ratio)**

The Power Sum version of ACR is based on PSNEXT and takes into account the combined NEXT disturbance of all adjacent wire pairs on each individual pair. This calculation yields 8 combinations – one for each wire pair from both ends of the link.

Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst case margin and the wire pair that exhibits the worst value for PSACR. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

11. **Propagation Delay**

Propagation delay is the time required for the signal to travel from one of the link to the other. This measurement is to be performed for each of the four wire pairs.

Minimum test results documentation (summary results): Identify the wire pair with the worst case propagation delay. The report shall include the propagation delay value measured as well as the test limit value.

12. **Delay Skew** (as defined in ANSI/TIA/EIA-568-B.1; Section 11.2.4.11).

This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.

13. **The following values are applicable to the Permanent Link Test and are required values to secure the Panduit Warranty at the time of this writing. Values at the time of installation shall take precedence.**

Electrical Value	over Standard (dB)
Insertion Loss	5.0%
NEXT	1.0
PSNEXT	1.5

ACR	5.0
PSACR	7.0
ELFEXT	5.0
PSELFEXT	8.0
Return Loss	3.0

4.07 TWISTED PAIR CABLING

All twisted pair cabling installed between the MPOE and the MDF and MDF to each IDF shall be tested for wire map and pair to pair continuity. Any pairs failing shall be replaced at no cost to the District. Submit certifying documentation that all pairs have passed.

4.08 COAXIAL CATV CABLE

A. The following measurements shall be made on each coaxial segment to include backbone and horizontal station runs using a Fluke DTX1800 with DTX-COAX adapters. Test results shall be saved and submitted in Fluke LinkWare format.

1. Cable Impedance-

Each segment shall be scanned with for cable impedance changes.

2. Quality- cable length, continuity, resistance, shorts and impedance on each segment.

4.09 AUDIO CABLES

A. All installed connector audio cables shall be tested with the appropriate tester to verify signal and shielding.

B. Cables which fail shall be repaired or replaced at no cost to the District.

C. Cables which are pre-manufactured shall be checked for end to end continuity.

4.10 VIDEO CABLES

A. All video cables shall be verified by injection of a local test source and verification on a local monitor.

SECTION 5.0 IDENTIFICATION, LABELING AND DOCUMENTATION REQUIREMENTS

5.01 IDENTIFICATION

A. All Fiber Optic, Data, CATV, Twisted Pair, Speaker, Video, Audio and Grounding and Bonding cables shall be labeled at each end with approved identification products listed.

B. All labeling schemes, room number and other identification information must be approved by the District Technology Project Manager prior to installation.

C. Labels shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

D. Labels shall be preprinted using a mechanical means of printing (e.g., laser printer).

E. Where used for cable marking, provide vinyl substrate with a white printing area and a clear "tail" that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.

- F. Where insert type labels are used, provide clear plastic cover over label.
- G. Tags shall be securely attached to the cable or device.
- H. Backbone Fiber, UTP and Station UTP and Coaxial cables shall be labeled within 2" of the end of their outer sheath.
- I. The District uses the following label schemes for identification purposes:
 - 1. All backbone Fiber, UTP and Coaxial cables shall be labeled to identify the Origin and IDF being served at both ends.
 - 2. All horizontal Fiber, UTP and Coaxial Station cables shall be labeled with the room number and port within that room being served.
 - 3. All Audio Cables shall be labeled at each end to reflect destination and origin. See Projection or Audio System cable chart.
 - 4. Conduits shall be labeled at both ends showing IDF or room being served.

5.02 LABELING

A. SYSTEM COMPONENTS

The contractor shall be responsible for the physical labeling of all of the following communication system components in complete conformance with TIA/EIA-606–A Administration Standards and District Standards. See Section 2.10 B.10- Labeling, for approved label components.

- 1. The components shall include, but are not limited to the following:
 - a. Fiber (both ends).
 - b. UTP Cable (both ends).
 - c. Fiber and Copper patch panels
 - d. Termination positions
 - e. Multi pair Cat 5e telephone backbone
 - f. Coaxial CATV backbone cable (both ends)
 - g. Audio Visual cables.
 - h. Projection and control system cables
 - i. Audio cables
 - j. Conduits (both ends)
 - k. Cover plates
 - l. Bonding and grounding conductors.

- m. Grounding bus bars. (TMGB and TGB)
 - n. Racks and Cabinets
- 2. Cable and patch panel number assignments shall be the same at both ends.
 - 3. Number assignment shall match the final room number, not the architectural room number. Architectural numbers may have used for diagrammatic purposes in these specifications and drawings.
 - 4. See Typical Classroom Patch Panel Layout for sample of required numbering scheme. Labeling scheme shall use final occupied room number and in classrooms, shall start at the front three port faceplate location. The remaining order shall be the second two port faceplate, the six port faceplate and the final one port data faceplate at the projector. In classrooms, the Yellow data jack at the projector shall always be the 12th jack.
 - 5. In all non-classroom spaces such as offices and work areas, a clockwise pattern starting at the designated location shall be used (ex. 301-01, 301-02, 301-03...).
 - 6. Fiber optic cables shall be identified by the Origin and IDF being served. (ex. 100-1A/B, 2A/B, 3A/B at the MDF and 100-1B/A, 2B/A, 3B/A at the IDF).
 - 7. Coaxial backbone and horizontal cables shall be identified at each end as specified elsewhere in this section.

B. RECORDS

- 1. Data system component records shall fully conform to TIA/EIA-606-B Administration Standards and as specified by the District. Each component shall have as a minimum, the room number and port number information, coax and fiber origination and destination and fiber number as outlined in Table 4.7-1 of TIA/EIA-606-B. The San Ramon Valley Unified School District has developed its own numbering scheme as described in section 5.01 of this document. See **Typical Classroom Patch Panel Layout** for specific room number examples.

5.03 ADMINISTRATION AND DOCUMENTATION

- A. Administration of the documentation shall include test results of each Fiber link, Category 6A Permanent Link, UTP Phone and Coaxial cable.
- B. The test result information for each Fiber and Category 6A link shall be recorded in the memory of the field-test instrument upon completion of the test. The test result records saved within the field-test instrument shall be transferred into Fluke LinkWare, a Windows™-based database utility, that allows for the maintenance, inspection and archiving of these test records.
- C. All UTP cable shall be documented to show all pairs available.
- D. Provide complete small form drawings including electronic file copy, such as Visio or Auto Cad, showing final fiber optic backbone cabling and pathway with all junction boxes, pass-through, or other pertinent pathway information.
- E. All test results must be permanently recorded and presented in the test equipment native file format to the District Technology Project Manager not more than 5 working days after completion of the testing and before system acceptance. Any pairs, strands or cables failing to meet the above indicated standards must be removed and replaced at no cost to the District, with cables that prove,

in testing, to meet the standards. The installation will not be accepted until testing has indicated a 100% availability of all terminated fiber strands, copper UTP, coaxial and twisted pair phone cables or the District has approved any deviation from this requirement. Upon completion of the above tests and remedies, submit two (2) copies of the written and electronic test results including numerical values (where applicable), graphs, etc. for all measurements for review by the District prior to final acceptance. Where applicable, submit viewing software required to view reports.

- G. With the above report, Contractor must submit written certification that 100% of the installation conforms to specifications, is complete, and is ready for operation.
- H. Upon the completion of the phase or project and prior to acceptance by the District Technology Project Manager, Contractor shall provide the structured cabling system manufacturer's warranty on all fiber optic and Category 6A data cabling with no less than a twenty-five (25) year product warranty, twenty-five (25) year application warranty.
- I. All test reports in native electronic file format shall be recorded to CD with three (3) copies being provided to the District.

SECTION 6.0 INSPECTION AND ADJUSTMENTS

6.01 INSPECTION SCHEDULE

The following inspection schedule shall be used during the course of this project. If the project is a multi-phased project, each phase shall be inspected accordingly. The contractor shall request an inspection with the District Technology Project Manager or their representative by giving 48 hours notice. Inspections may be scheduled by calling the Technology Project Manager directly at 925-824-1817.

A. ROUGH INSPECTIONS

- 1. Rough conduit and cable pathways prior to wall close-up.
- 2. Projection system rough conduits, where installed prior to wall close up.
- 3. Rough Fiber Optic, Category 6A, Coaxial Cabling, Audio Cabling and Video Cabling installation prior to ceiling closure or termination.

B. PRE-TERMINATION INSPECTIONS

- 1. Cable tray, Data rack(s), cabinets and other support structures prior to installation of the cabling.
- 2. Fiber Optic cable installations.
- 3. Category 6A cable installation.
- 4. Backbone Phone cable installation.
- 5. CATV cable installations.
- 6. Audio-Visual cable installation.
- 7. IP Clock/Speaker and Zone Speaker cabling installation.

C. FINAL INSPECTIONS

1. Grounding and Bonding system components.
2. Conduit and pathways tagged and labeled.
3. Final inspection of racks, cabinets, support structures, cable trays and other termination hardware.
4. Completed UTP cable terminations, labeling, supplied hardware and all testing completed.
5. Completed Fiber Optic cable terminations, labeling, supplied hardware and all testing completed.
6. Completed CATV terminations, labeling, supplied hardware and all testing completed.
7. Completed Audio-Visual installation and terminations, labeling, supplied hardware and all testing completed.
8. Random spot testing completed by the District or its representative of all installed cabling. Test results shall become the basis for determining additional re-inspections and testing.
9. Completed IP Clock-Speaker and Zone Speaker installations.
9. Contractor shall inspect all installed work in conjunction with the District Technology Project Manager or their representative and develop a "punch-list" for all items needing correction. This work, and the required remediation(s), shall be performed prior to system acceptance.
10. One re-inspection by the District or its representative will be allowed to the data installation contractor. Additional re-inspection costs, until full compliance is obtained, shall be borne by the data installation contractor.

6.02 ADJUSTMENTS

Make changes or adjust the system to allow optimum operation for final use. Contractor is responsible for making changes to the system such that any defects in workmanship are corrected and all cables and the associated termination hardware passes the minimum test requirements as set forth by this document.

6.03 DISTRICT REQUIREMENTS

1. The District Technology Project Manager shall have the right to inspect contracted work at any time. In the event of questionable work, the District's reasonable decisions with respect to necessary corrective action shall be final. District Technology Project Manager and Contractor representatives shall make a joint inspection of the systems before Systems Acceptance. The inspection shall be of such character and extent as to disclose any unsatisfactory condition of the cabling infrastructure, apparatus or equipment. Upon discovery and validation of the existence of any unacceptable condition(s), Contractor shall act to rectify such condition(s) as quickly as possible so as not to negatively impact the project implementation schedule. The District shall be notified in writing of the correction of all unacceptable conditions as soon as they are completed. The District reserves the right to re-inspect corrected Work.

2. The District Technology Project Manager will select a random sample of 40% of the installed fiber, Category 6A, coaxial, audio-visual and twisted pair links. The District Technology Project Manager or District's representative shall test these randomly selected links and the results are to be stored. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the District representative shall repeat 100% testing and the cost, including the time of the District representative, shall be borne by the installation contractor. In addition, the random selected fiber optic links shall be visually inspected for endface termination quality and cleanliness.

SECTION 7.0 PROJECT CLOSE-OUT

7.01 SUBMITTALS

A. Required to be submitted prior to final acceptance of system:

1. Mylar reproducible and data disk of record documentation showing locations of all stations and cable routing of all station pairs. Any drawing(s) accompanying this submittal shall be prepared using AutoCAD or Visio. Drawings shall fully represent actual installed conditions and shall incorporate all revisions made during the course of construction.
2. All Copper and Fiber test results in their native tester format shall be submitted on a USB Flash Drive.
3. All test results shall be organized by building, by floor and cable type in numerical order.
4. Manuals for testing, operation and training, as required.
5. Clear plastic laminated Visio, PDF or other small format floor plan showing data jack locations and numbering for each building MDF/IDF. Provide 3 copies of each. One copy shall be installed at the MDF and each IDF by the data rack.
6. Network jack termination tools as used to terminate jacks, faceplates, patch panels, wire management, or other devices requiring specialized tools. Fiber optic termination tools are not required.
7. All Punch Lists signed off by District Technology Project Manager. Submit copy of signed and completed lists.

B. OPERATION AND MAINTENANCE MANUAL

Supply operation and maintenance manuals, to include the following:

1. A detailed explanation of the operation of the system.
2. Pictorial parts list and part numbers.
3. Schematic wiring diagrams, grounding systems, pathways or other diagrams as may be necessary for the District to maintain the system(s).
4. Telephone numbers for the authorized parts and service distributor.

7.02 FINAL CLEANING

- A. All contractor installed equipment, cabling, fiber optic connectors, racks, wire management and other network equipment shall receive a final cleaning prior to turnover to the District.
- B. If at the time of "Turnover", the District finds that the equipment in the MDF and or IDF's is dirty, the contractor shall promptly clean all equipment, racks and fiber optic connectors. Fiber optic connectors shall be cleaned by a trained individual. The District shall inspect the fiber optic connectors to insure that they are clean.

7.03 TRAINING

At the completion of all work, a period of not less than four hours shall be allocated by the Contractor for instruction and training for the District. The cabling contractor will need to describe how the cable from each faceplate is separated between different patch panels, how cross-connects are made, and other basic cable plant management skills.

7.04 CERTIFICATION

Upon completion and receipt of the following items, the District shall notify the contractor and the Architect of Record in writing of formal acceptance of the system.

- A. All contracted work is complete in accordance with these specifications and drawings.
- B. Punch list items are completed and verified.
- C. Test documentation has been submitted and verified.
- D. Performance Warranty documentation has been submitted.
- E. Required network equipment has been delivered, installed and/or configured and deemed operational by the District as specified in Section 8.
- F. All documents and submittals as called for herein.
- G. As built drawings showing all cable pathways, junctions, equipment locations, grounding points and other details as required to allow for District maintenance and support.
- H. All Re-Inspection fees or back-charges have been paid in full.

SECTION 8.0 NETWORK HARDWARE SCHEDULE

The following list of Active Network Hardware and components shall be supplied, installed and configured as indicated under this contract. Contractor shall verify all products prior to ordering.

8.1 PROJECTION AND AUDIO SYSTEMS

- A. Where shown on the drawings, Projection and Audio Control Cabinets with solid doors, as manufactured by Middle Atlantic, DWR, WR, ISRK or SR Series shall be provided and installed.

- B. Where shown on the drawings, projector ceiling and/or wall mounts as manufactured by Chief Manufacturing shall be installed in standard classrooms, science rooms, tech labs, computer labs, library, MPR and other locations.
- C. Contractor to provide and install specified projection and audio system cabling and connectors. Cables shall be of the shortest length possible and shall be free of couplers or splices. No AV cable shall be greater than 35 feet maximum except speaker and/or control cable.
- D. Contractor to install AVS1 or AVS2 classroom, meeting room conference room ceiling speakers where designated. All speakers shall be wired in series with cable terminating at the projector location. Leave 10 feet of service loop at the projector.
- E. Where the Contractor is to install District provided projector, audio, and control system components, projectors shall be aligned, focused and calibrated. Audio microphones shall be paired to the room receiver. User components shall be bagged, labeled by room number and turned over to the District.

8.2 IP CLOCK SPEAKERS AND ZONE SPEAKERS

The District shall provide to the contractor the following speaker components for cabling and installation.

- A. IP CLOCK SPEAKER backboxes with supplied brackets only. Additional brackets or mounting may be required.
- B. Zone Speaker backboxes with supplied brackets only. Additional brackets or mounting assemblies may be required.
- C. IP CLOCK SPEAKER faceplates with connecting patch cords to be installed at time of project completion.
- D. Interior/Exterior Zone Speakers and grills to be installed at time of project completion. Speakers shall have taps set to 70 volt/2 watts unless otherwise designated. Verify with District prior to installation.
- E. Zone Speaker amplifiers shall be installed and connected on the rack or cabinet in locations shown. Speakers shall be connected to the 70 volt terminals.

EXHIBIT 4

SRIR INQUIRY DATED JULY 12, 2018 FOR COMPETITIVE BIDDING

Competitive Bidding

Issue

It was determined that Form 471 # 181035231 FRN 1899067688, 1899067716 & 1899067743 will be denied because the RFP "RFP763 - Network Wiring Middle Schools" and "SRVUSD Data Technical Specifications 2018" that you have cited contains a particular manufacturer's name, brand, product or service: Contractor shall be a currently registered Panduit Silver, Gold or Platinum Panduit Partner at the time of bid and installation, but did not include the words "or equivalent" to describe the requested products or services. For additional information on the competitive bidding process, please refer to the USAC website at: <http://www.usac.org/sl/applicants/step01/default.aspx>.

If the FRNs should not be denied and you have alternative information, please provide the supporting documentation. If you would like to provide any additional explanation to support your position, type your explanation and attach the explanation and/or documentation into your response by using the Add Document button. If you agree with the proposed action, click the "Submit" button to clear this item from your Pending Inquiries.

We do not agree with the determination by USAC that Form 471 # 181035231 FRN 1899067688, 1899067716 & 1899067743 should be denied due to competitive bidding violations. FCC Form 470 # 180014601 and referenced RFP "RFP763 - Network Wiring Middle Schools" and "SRVUSD Data Technical Specifications 2018" is a request for labor and installation only. There are no products or equipment being requested in either the Form 470 or RFP. All materials are being provided by the District for the prospective vendors to install. This is indicated on page 4 of "RFP763 - Network Wiring Middle Schools", under INTRODUCTION, the end of the first paragraph: "Materials will be provided by the district". Therefore the words "or equivalent" are not applicable since there is not an equivalent for labor or installation.

EXHIBIT 5

SAN RAMON VALLEY UNIF SCH DIST FUNDING COMMITMENT DECISION LETTER

Funding Commitment Decision Letter

Funding Year 2018

Contact Information:

Greg Pitzer
SAN RAMON VALLEY UNIF SCH DIST
699 OLD ORCHARD DR
DANVILLE, CA 94526
gpitzer@srvusd.net

FCC Form 471: 181035231**BEN:** 144183**Wave:** 16**Application Nickname:** SanRamonValleyUSD471F
Y2018C2- Middle Cabling

Totals

Total Committed	\$0.00
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What is in this letter?

Thank you for submitting your application for Funding Year 2018 Schools and Libraries Program (E-rate) funding. Attached to this letter, you will find the funding statuses for the FCC Form(s) 471, Services Ordered and Certification Form, that you submitted and referenced above.

The Universal Service Administrative Company (USAC) is providing this information to both the applicant(s) and the service provider(s) so that all parties are aware of the post-commitment changes related to their funding requests and can work together to complete the funding process for these requests.

Next Steps

1. Work with your service provider(s) to determine if your bills will be discounted or if you will request reimbursement from USAC after paying the full cost for the services you receive.
2. Review the [Children's Internet Protection Act \(CIPA\)](#) requirements and file the [FCC Form 486](#) (Service Confirmation and CIPA Certification Form). **The deadline to submit this form is 120 days from the date of this letter or from the service start date (whichever is later).**



BEN Name: SAN RAMON VALLEY UNIF SCH DIST
BEN: 144183

FCC Form 471: 181035231
Wave: 16

3. Invoice USAC

- **If you (the applicant) are invoicing USAC:** You must pay your service provider(s) the full cost for the services you receive and file the [FCC Form 472](#), the Billed Entity Applicant Reimbursement (BEAR) Form, to invoice USAC for reimbursement of the discounted amount.
- **If your service provider(s) is invoicing USAC:** The service provider(s) must provide services, bill the applicant for the non-discounted share, and file the [FCC Form 474](#), the Service Provider Invoice (SPI) form, to invoice USAC for reimbursement for the discounted portion of costs. Every funding year, service providers must file an [FCC Form 473](#), the Service Provider Annual Certification Form, to be able to submit invoices and to receive disbursements.
- **To receive an invoice deadline extension, the applicant or service provider** must request an extension on or before the last date to invoice. **If you anticipate, for any reason, that invoices cannot be filed on time**, USAC will grant a one-time, 120-day invoice deadline extension if timely requested.

How to Appeal or Request a Waiver of a Decision

You can appeal or request a waiver of a decision in this letter **within 60 calendar days** of the date of this letter. Failure to meet this deadline will result in an automatic dismissal of your appeal or waiver request.

Note: The Federal Communications Commission (FCC) will not accept appeals of USAC decisions that have not first been appealed to USAC. However, if you are seeking a waiver of E-rate program rules, you must submit your request to the FCC and not to USAC. USAC is not able to waive the E-rate program rules.

- **To submit your appeal to USAC**, visit the Appeals section in the [E-rate Productivity Center \(EPC\)](#) and provide the required information. USAC will reply to your appeal submissions to confirm receipt. Visit USAC's [website](#) for additional information on submitting an appeal to USAC, including step-by-step instructions.
- **To request a waiver of the FCC's rules**, please submit it to the FCC in proceeding number CC Docket No. 02-6 using the [Electronic Comment Filing System](#) (ECFS). Include your contact information, a statement that your filing is a waiver request, identifying information, the FCC rule(s) for which you are seeking a waiver, a full description of the relevant facts that you believe support your waiver request and any related relief, and any supporting documentation.

For appeals to USAC or to the FCC, be sure to keep a copy of your entire appeal, including any correspondence and documentation, and provide a copy to the affected service provider(s).



Obligation to Pay Non-Discount Portion

Applicants are required to pay the non-discount portion of the cost of the eligible products and/or services to their service providers. Service providers are required to bill applicants for the non-discount portion of costs for the eligible products and/or services. The FCC stated that requiring applicants to pay the non-discounted share of costs ensures efficiency and accountability in the program. If using the BEAR invoicing method, the applicant must pay the service provider in full (the non-discount plus discount portion) **before** seeking reimbursement from USAC. If using the SPI invoicing method, the service provider must first bill the applicant **before** invoicing USAC.

Notice on Rules and Funds Availability

The applicants' receipt of funding commitments is contingent on their compliance with all statutory, regulatory, and procedural requirements of the Schools and Libraries Program and the FCC's rules. Applicants who have received funding commitments continue to be subject to audits and other reviews that USAC and/or the FCC may undertake to assure that committed funds are being used in accordance with such requirements. USAC may be required to reduce or cancel funding commitments that were not issued in accordance with such requirements, whether due to action or inaction of USAC, the applicant, or the service provider. USAC, and other appropriate authorities (including but not limited to the FCC), may pursue enforcement actions and other means of recourse to collect improperly disbursed funds.



BEN Name: SAN RAMON VALLEY UNIF SCH DIST
BEN: 144183

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Funding Commitment Decision Overview

Funding Year 2018

Application Comments for FCC Form 471: #181035231

The applicant did not submit any RAL corrections.

Funding Commitment Decision Overview

Funding Request Number (FRN)	Service Provider Name	Amount Requested	Amount Committed	Status
1899067688	Digital Design Communications	\$10,883.20	\$0.00	Denied
1899067716	Digital Design Communications	\$4,435.20	\$0.00	Denied
1899067743	Digital Design Communications	\$11,435.20	\$0.00	Denied



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FRN 1899067688	Service Type Internal Connections	Status Denied
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Dollars Committed			
Monthly Cost		One-time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$15,686.06
Total Pre-discount Charges		\$15,686.06	
Discount Rate		40.00%	
Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	9/30/2019
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Funding Commitment Decision Comments

DR1: Applicants are required to conduct a fair and open competitive bid process. Applicants are also prohibited from specifying a manufacturer's name or brand on their FCC Form 470 or in request for proposal (RFP) without also indicating that equivalent services would be considered. During the review, it was determined that an RFP issued specified that any bidder "must be Panduit certified" as a bid requirement and did not allow for equivalent certifications. Therefore, this FRN is denied. <><><><><> MR1: The funding request amount was reduced from



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\$27,208.00 to \$15,686.06 to remove the amount that exceeded the Category Two budget set for the following entity:
108622 LOS CERROS MIDDLE SCHOOL.



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FRN 1899067716	Service Type Internal Connections	Status Denied
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Dollars Committed			
Monthly Cost		One-time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$11,088.00
Total Pre-discount Charges		\$11,088.00	
Discount Rate		40.00%	
Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	9/30/2019
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Funding Commitment Decision Comments

DR1: Applicants are required to conduct a fair and open competitive bid process. Applicants are also prohibited from specifying a manufacturer's name or brand on their FCC Form 470 or in request for proposal (RFP) without also indicating that equivalent services would be considered. During the review, it was determined that an RFP issued specified that any bidder "must be Panduit certified" as a bid requirement and did not allow for equivalent certifications. Therefore, this FRN is denied.



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FRN 1899067743	Service Type Internal Connections	Status Denied
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Dollars Committed			
Monthly Cost		One-time Cost	
Months of Service	12		
Total Eligible Recurring Charges	\$0.00	Total Eligible One Time Charges	\$28,588.00
Total Pre-discount Charges		\$28,588.00	
Discount Rate		40.00%	
Committed Amount		\$0.00	

Dates	
Service Start Date	7/1/2018
Contract Expiration Date	9/30/2019
Contract Award Date	3/16/2018
Service Delivery Deadline	9/30/2019
Expiration Date (All Extensions)	

Service Provider and Contract Information	
Service Provider	Digital Design Communications
SPIN (498ID)	143026591
Contract Number	
Account Number	
Establishing FCC Form 470	180014601

Consultant Information	
Consultant Name	Scott Harken
Consultant's Employer	CSM Consulting Inc.
CRN	16043564

Funding Commitment Decision Comments

DR1: Applicants are required to conduct a fair and open competitive bid process. Applicants are also prohibited from specifying a manufacturer's name or brand on their FCC Form 470 or in request for proposal (RFP) without also indicating that equivalent services would be considered. During the review, it was determined that an RFP issued specified that any bidder "must be Panduit certified" as a bid requirement and did not allow for equivalent certifications. Therefore, this FRN is denied.

EXHIBIT 6
SAN RAMON VALLEY USD C2 USAC APPEAL FY 2018



September 21, 2018

Letter of Appeal
Schools and Libraries Division – Correspondence Unit
30 Lanidex Plaza West
PO Box 685
Parsippany, NJ 07054-0685

RE: **APPEAL OF FUNDING COMMITMENT DECISION LETTER FOR FUNDING YEAR 2018**

To Whom It May Concern:

This is a letter of appeal relating to the Funding Commitment Decision Letter issued by USAC on July 27, 2018 for the following:

Appellant/Organization Name	San Ramon Valley Unified School District
BEN	144183
Form 471	181035231
Funding Request Number(s)	1899067688, 1899067716, 1899067743

This letter is to appeal the Decision to Deny all funding requests of FCC Form 471 181035231 per the Funding Commitment Decision Letter Comments:

DR1: Applicants are required to conduct a fair and open competitive bid process. Applicants are also prohibited from specifying a manufacturer's name or brand on their FCC Form 470 or in request for proposal (RFP) without also indicating that equivalent services would be considered. During the review, it was determined that an RFP issued specified that any bidder "must be Panduit certified" as a bid requirement and did not allow for equivalent certifications. Therefore, this FRN is denied.

San Ramon Valley Unified School District ("SRVUSD") respectfully requests that USAC reverse the decision to deny the FRNs listed above as the reasons given for the denial were not applicable to this application. The FCC Form 471 181035231 requested E-Rate funding for installation and labor services only for supplemental wiring at (3) locations. There was no equipment being requested as all of the wiring materials were to be provided by the applicant for the awarded bidder to install. This fact would make the "or equivalent" provision not applicable. The requirement to allow equivalent certifications is not applicable in this scenario because the materials were to be provided by the applicant for installation and of a specific manufacturer's brand name (Panduit). This was to be a supplemental wiring project at the school sites that would be tying into existing Panduit connections. Choosing a non-Panduit solution would invalidate the warranties on the existing Panduit system and necessitate the replacement of the existing wiring, connections and hardware. We request that the aforementioned FRNs be made available for review based upon the original funding request due to these reasons as no bidding violations occurred. These very valid reasons are why this application should not have been denied which we expressed to the SRIR reviewer as detailed below.

Timeline:

Once the SRIR review was issued on April 9, 2018 we started the data collection process in order to respond to the questions being asked by the SRIR reviewer. Among the documents supplied to the reviewer were copies of the RFP and other supporting documents.

On July 12, 2018 the reviewer issued a denial notification in EPC citing competitive bidding violations. In our response to the reviewer we expressed our disagreement with the decision to deny based on a competitive bidding violation. The rationale we provided to the reviewer as to why the "or equivalent" was not applicable (labor and installation only) was legitimate and does not constitute a competitive bidding rule violation.

We respectfully request that USAC reverse the decision to deny Form 471 181035231 and reinstate the FRNs 1899067688, 1899067716, 1899067743 to the amounts that were originally requested. San Ramon Valley USD did not violate any of the E-rate's competitive bidding rules.

Please feel free to contact me with any further questions. Thank you for your consideration.

Sincerely,

Scott Harken
Director, E-Rate Services
CSM, Inc.
28459 S. Chrisman Road
Tracy, CA 95304
888.944.7798 Phone
209.221.0250 FAX
sharken@csmcentral.com

Attachment:
RFP 763 – Wiring Middle Schools
SRVUSD Data Specifications
SRIR Inquiry dated July 12, 2018 for Competitive Bidding

EXHIBIT 7

SANRAMONVALLEYUSD470Y2018C2- CABLING MIDDLE SITES - #180014601

SanRamonValleyUSD470Y2018C2- Cabling Middle Sites - #180014601

[Summary](#) [Generated Documents](#) [News](#) [Related Actions](#)

Please note: The following fields pull the most current data from the Contact User Profile and Applicant Entity Profile: Recipient(s) of Service, Contact Name, and Contact Phone Number. If you would like to review this FCC Form 470 with the data that was present upon certification, please navigate to the Generated Documents related dashboard on the left-hand side and click the Original Version document link.

Application Information

Nickname	SanRamonValleyUSD470Y2018C2- Cabling Middle Sites	Created Date	1/11/2018 11:16 AM PST
Application Number	180014601	Created By	Scott Harken
Funding Year	2018	Certified Date	1/12/2018 4:46 PM PST
Status	Certified	Certified By	Greg Pitzer
Allowable Contract Date	2/9/2018	Last Modified Date	1/12/2018 4:46 PM PST
		Last Modified By	Greg Pitzer

Billed Entity Information

Name SAN RAMON VALLEY UNIF SCH DIST **Billed Entity Number (BEN)** 144183

Application Type and Recipients of Service

Applicant Type	School District	Number of Eligible Entities	38
Recipient(s) of Service	<input type="checkbox"/> Public School		
	<input type="checkbox"/> New Construction School		
	<input type="checkbox"/> Public School District		

Contact Information

Name Greg Pitzer **Phone Number** 925-552-2951
Email gpitzer@srvusd.net

Services Requested

There are no Services Requested For Category 1

Category 2: Internal Connections and Managed Internal Broadband Services

Type	Function	Number Entities	Quantity	Unit	Manufacturer	Manufacturer Other Description	Installation and Initial Configuration ?	Associated RFP
Internal Connections	Cabling	3		Feet	Other	Labor, Installation and/or Professional Services Only	Yes	View RFP Documents

Category Two Narrative

District is seeking pricing for Installation of Classroom Network Wiring. For a complete description of Installation of Classroom Network Wiring please refer to "Request for Proposal #763 - Installation of Classroom Network Wiring".

Technical Contact Information

A technical contact has not been indicated

State or Local Procurement Requirements

Please refer "Request for Proposal #763 - Installation of Classroom Network Wiring". For questions regarding the services in which San Ramon Valley USD is seeking under this Form 470. Please email Greg Pitzer, Director of Technology at gpitzer@srvusd.net. Last day for all questions is February 22, 2018. Answers to questions will be available on the USAC EPC website and the District website at www.srvusd.net/eraterfp. Mandatory site walks will be held on January 30 & 31, 2018, details and locations found in RFP. The district is seeking installation only, NO equipment. All bids must be addressed to San Ramon Valley Unified School District Purchasing Department 3280 Crow Canyon Road, San Ramon, CA 94583, ATTN: Jasmine Gucason, Purchasing Director and must be received by 3:00pm on March 1, 2018. This bid is available on the USAC EPC website and at the District website www.srvusd.net/eraterfp. Addendums will be posted and available on the USAC EPC website and the District website. Late submissions will not be accepted or considered.