



HIGHLINE SCHOOL DISTRICT No. 401
15675 Ambaum Boulevard SW Burien WA 98166

***OUR PROMISE: Every student in Highline School District #401
is known by Name, Strength, and Need, and graduates ready
for the future they choose.***

REQUEST FOR PROPOSAL

FOR: SWITCHES/SERVICES, RFP 18/19-4

Highline School District No. 401 RFP #18/19-4

Release Date: January 24, 2019

Proposal Responses Due
February 22, 2019 BY 2:00 P.M. PST
(Pacific Standard Time)

Official Contact:

Mark Finstrom, Chief Technology Officer

Mark.Finstrom@HighlineSchools.org

206.631.3330

Official RFP Page:

www.highlineschools.org/purchasing

Introduction

The Highline Public Schools No. 401, hereinafter referred to as “the District” is seeking the services of a qualified Service Provider(s) to provide switches/services to serve the interest of the District and other similar services.

This RFP is part of ERATE 470 for Highline School District #401; however, this section supports Inter-local language to allow any Washington school district, should they elect to use Highline’s RFP for acquisition of equipment (identified in this RFP), as allowed by USAC guidelines.

The provider(s) will report to the Chief Technology Officer for the District.

This RFP contains instructions for submitting a proposal, the procedures and criteria by which a Service Provider(s) will be selected and the contractual terms by which the District proposes to govern the relationship between it and the selected Service Provider(s).

Highline Public Schools No. 401 provides equal access to its programs and services for all people without regard to race, creed, color, religion, national origin, age, gender, sexual orientation, marital status or disability.

The District appreciates your consideration of this RFP and looks forward to receiving your proposal.

Background Information

The District is comprised of one (1) early learning center, two (2) grades 7-12 school locations, four (5) middle school locations, twelve (12) high school locations, one (1) athletic stadium, eighteen (18) elementary school locations, one (1) administrative office and several support facilities (transportation, maintenance, facilities management, etc.).

The central office of the District is located at 15675 Ambaum Boulevard S, Burien Washington, 98166 in the County of King, State of Washington. The District has an approximate student population of 19,000 and an administrative/teaching/support staff of approximately 2,500.

District Information can be obtained on the web at www.highlineschools.org. If you require special assistance or this information in an alternative format, please contact Tracey David, Purchasing Manager, at 206.631.3202 or Tracey.David@highlineschools.org. The District reserves the right to extend the date(s), if required.

Schedule of Events

January 24, 2019	RFP Available on District Website: www.highlineschools.org/purchasing
January 24, 2019	First Advertisement
January 30, 2019	Second Advertisement
February 15, 2019	Deadline for Questions from Potential Bidders.
February 1, 2019	Required presentation and walk-through for wiring providers.
February 22, 2019, 2:00 p.m.	Sealed Proposals Due, <i>15675 Ambaum Blvd. SW, Burien, WA 98166</i>
February 22, 2019, 2:05 p.m.	Public Opening and Reading Olympic Conference Room, <i>15675 Ambaum Blvd. SW, Burien, WA 98166</i>

HIGHLINE PUBLIC SCHOOL DISTRICT #401

Burien, Washington

TERMS AND CONDITIONS OF REQUEST FOR PROPOSAL

RFP 18/19-4

It is understood that the **company/individual** submitting a proposal, accepts the following general specifications and conditions which are all considered to be a part of the Request for Proposal (RFP) document.

1. OPENING OF PROPOSALS

All proposals received shall be opened in public at the address shown on the cover sheet of this RFP package.

2. UNIT PRICE

It is understood that the quantities stated are approximate only and are subject to either increase or decrease at the discretion of the District and stated only for the purpose of comparing the proposals, and that should the quantities of any of the items be increased, the undersigned shall furnish the additional articles at the unit price set out herein; and should the quantities be decreased, payment will be made on actual quantities received and the undersigned proposer will make no claims for anticipated profits or additional compensation for any increase or decrease in the quantities.

3. ACCEPTANCE OF PROPOSAL

Notice of acceptance of this proposal or requests for additional information shall be addressed to the undersigned at the address stated below.

4. TIME FOR CONTRACTING

It is understood that this proposal may not be withdrawn nor, may the Agency refuse to accept any contract, proffered based on this RFP within 45 days after the date set for the opening thereof without forfeiture of the bid security if a bid security is required for this RFP.

5. AWARD OF CONTRACT

The Board of Directors at a regular meeting shall award all contracts.

6. DELIVERY OF GOODS OR SERVICES

Pursuant to and in compliance with the Information to Proposers and other documents relating thereto, the undersigned hereby proposes to furnish and deliver any or all of the services enumerated in proposal at the prices quoted herein.

7. EMPLOYEES WHO HAVE BEEN CONVICTED OF CRIMES INVOLVING CHILDREN

RCW 28A.400.330 prohibits a bidder, or any of its sub-bidders, from utilizing any employee at a public school who has contact with children at a public school during the course of his or her employment and who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child under chapter 9A.42 RCW, the physical injury or death of a child under chapter 9A.32 or 9A.36 RCW (except motor vehicle violations under chapter 46.61 RCW), sexual exploitation of a child under chapter 9.68A RCW, sexual offenses under chapter 9A.44 RCW, where a minor is the victim, promoting prostitution of a minor under chapter 9A.88 RCW, the sale or purchase of a minor child under RCW 9A.64.030, or violation of similar laws or another jurisdiction. Failure to comply with this section shall be grounds for the school district to immediately terminate the contract.

8. DEBARMENT, SUSPENSION AND INELIGIBILITY CERTIFICATION

To the best of its knowledge and belief, the Bidder or any of its principals are not presently debarred, suspended, proposed for debarment or otherwise declared ineligible for the award of contracts by any Federal agency by the inclusion of the Bidder or its principals in the current "LIST OF PARTIES EXCLUDED FROM FEDERAL PROCUREMENT OR NONPROCUREMENT PROGRAMS" published by the U.S. General Services Administration Office of Acquisition Policy.

The prospective lower tier participant shall provide immediate written notice to the District if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. Should the prospective lower tier participant enter into a covered transaction with another person at the next lower tier, the prospective lower tier

participant agrees by accepting this agreement that it will verify that the person with whom it intends to do business is not excluded or disqualified.

9. USE OF TOBACCO IN SCOOOL PREMISES

RCW 28A210.310 prohibits the use of tobacco in any form on school district property. Smoking or other use of tobacco will not be permitted at the job site.

10. LAWS

The Bidder agrees to fully comply with all Federal, state and local laws, orders, rules, regulations and ordinances, including but not limited to those relating to industrial insurance, medical aid, unemployment compensation, pension, social security, minimum wages, equal employment, safety standards and building codes, and the bidder shall indemnify and save harmless the District for any claim, liability or expense by reason of the failure of the bidder or any of its sub-contractors to comply with such laws, orders, rules, regulations or ordinances.

11. INDEMNIFICATION

The proposer agrees that to the fullest extent permitted by law, proposer will hold harmless, defend, and indemnify the District, its agents, employees, and board members from any and all liabilities, penalties, losses, damages, claims, expenses, attorneys' fees, taxes, expenses of litigation, judgments, suits, liens, and encumbrances, without limitation, arising out of or resulting from any and all acts or omission by the proposer under the contract. The District shall have the right to demand that the proposer defend any and all claims, lawsuits, or proceedings related to services provided under the contract, without cost to the District, with a lawyer acceptable to the District. The terms of this section shall survive termination of this contract.

The District agrees that to the fullest extent permitted by law, the District will hold harmless, defend, and indemnify the proposer, its agents, employees, and the board members from any liabilities, penalties, losses, damages, claims, expenses, attorneys' fees, taxes, expenses of litigation, judgments, suits, liens, and encumbrances, without limitation, arising out of or resulting from the negligence by the District.

12. CONFLICT OF INTEREST

The Proposer must disclose any professional or personal financial interest which a possible conflict of interest in could be representing the District shall be listed in your cover letter with your proposal.

13. INSURANCE

The Agency will secure and maintain through the duration of this agreement, insurance naming the Highline School District No. 401 District as additional insured at the level described below. The Agency will provide the District with copies of certificates of coverage from the insurance provider each year upon the renewal of this contract and at the expiration of the current certificate. This will be required once the proposal is awarded.

Workers Compensation insurance as required by the laws of the State of Washington and applicable federal laws.

Certificate of Insurance Requirements

1. Insurers affording coverage must carry a Best Rating of A-VIII or better.
2. Commercial General Liability Section
 - Must be Occurrence policy, refer Claims Made policies for Review
 - Washington Stop Gap coverage may be referenced in this section
 - General Aggregate Limit should apply "Per Project"
3. Additional Insured, Waiver of Subrogation columns must be checked for General Liability, Automobile Liability and Umbrella Liability (if required). Additional Insured forms CG2026 and Waiver of Subrogation form CG2404 (or equivalent) must be provided along with the Certificate of Insurance. Primary and Non-Contributory coverage is required, and a copy must be provided along with the Certificate of Insurance.
4. General Liability Each Occurrence Limit must be at least \$1, 000,000, General Aggregate Limit must be at least \$2,000,000 and the Products-Completed Operations Limit must be at least \$2,000,000.

5. "Any Auto" coverage, which includes Hired and Non-Owned automobiles, is required. If the company does not own any vehicles, then the "Hired Autos" and "Non- Owned Autos" coverage are required.
6. Automobile Limit of at least \$1,000,000 is required.
7. Excess/Umbrella coverage must be included, if required by the contract, at a limit of at least \$1,000,000.
 - The Retention/Deductible must not exceed \$10,000.
8. Washington Stop Gap coverage of at least \$1,000,000 is required (if not shown in the General Liability section).
9. Professional Liability coverage must be included at a limit of at least \$2,000,000 Per Occurrence.
 - The Retention/Deductible must not exceed \$10,000.
10. "Description of Operations" section should reference the contract name, number and service provided.

14. LEGAL FEES

The Agency covenants and agrees that in the event suit is instituted by the purchaser for any default on the part of the Agency, and the Agency is adjudged by a court of competent jurisdiction to be in default, he shall pay to the purchaser all costs, expenses expended or incurred by the purchaser in connection therewith, and reasonable attorney's fees.

15. FORCE MAJEURE

Except for payment of sums due, neither party shall be liable to the other or deemed in default under this contract if and to the extent that such party's performance of this contract is prevented by reason of force majeure. The term "force majeure" means an occurrence that is beyond the control of the party affected and could not have been avoided by exercising reasonable diligence. Force majeure shall include acts of God, war, riots, strikes, fire, floods, epidemics, or other similar occurrences.

Notification if either party is delayed by force majeure, said party should provide written notification within forty-eight (48) hours. The notification shall provide evidence of the force majeure to the satisfaction of the other party. Such delay shall

cease as soon as practicable and written notification of it shall be provided. The time of completion shall be extended by contract modification for a period of time equal to the time that the results or effects of such delay prevented the delayed party from performing in accordance with this contract.

Rights reserved:

The District reserves the right to cancel the contract and/or purchase materials, equipment or services from the best available source during the time of force majeure, and Agency shall have no recourse against the District.

INSTRUCTIONS FOR COMPANIES SUBMITTING PROPOSALS

1. GENERAL INSTRUCTIONS

This specification constitutes the proposal form:

- A. Proposers will submit one signed original proposal and two (2) printed copies and an electronic proposal. The electronic proposal can be in the form of a CD or thumb drive. The proposals must be submitted on 8-1/2 X 11 inch paper, with some type of binder to keep the paper in order (no staples, please)
- B. The firm name and all requested data pertinent shall be filled in on the last 3 pages of this RFP and included with your proposal.
- C. The descriptions in this RFP have been prepared so as to identify clearly the basic requirements for each item. You are responsible for noting any and all exceptions to the required features specified.

2. PREPARATION OF PROPOSAL

All proposals must be submitted in sealed opaque envelope. **THE RFP NUMBER, DESCRIPTION, AND DATE AND TIME OF OPENING MUST APPEAR ON THE OUTSIDE OF THE ENVELOPE.** It is the sole responsibility of the company/individual submitting proposal to see that it received by the proper time.

Proposals received after the date and time scheduled for opening shall be returned to the sender unopened.

Proposals submitted by mail shall be addressed to:

HIGHLINE SCHOOL DISTRICT #401
Attn: MARK FINSTROM
15675 Ambaum Boulevard Southwest
Burien, WA 98166

Proposals submitted in person shall be delivered to:

Mark Finstrom
HIGHLINE SCHOOL DISTRICT #401
15675 Ambaum Boulevard Southwest
Burien, Washington 98166
Please call (206) 631-3000 for directions to this location if needed.

3. SIGNATURE

The proposal must bear the signature in longhand and in ink of the person or persons duly authorized to sign the proposal in the name of the company.

4. MODIFICATIONS

Changes in or additions to the RFP form, recapitulations of the work bid upon, alternate proposals or any other modifications of the RFP form which are not specifically called for in the contract documents, may result in the District rejecting the proposal as not being responsive to the invitations. No oral or telephonic modification of any proposal submitted will be considered.

5. ERASURES

The person or persons signing the proposal must initial any erasures, interlineations, or corrections in the RFP document.

6. EXAMINATION OF SITE, DRAWING, ETC.

The Agency shall thoroughly examine and be familiar with the specifications. The failure or omission of an Agency to receive or examine any form, instrument, addendum or other document or to visit the site and acquaint himself/herself with conditions there existing (if required in RFP document), shall in no way relieve any Agency from obligations with respect to his/her proposal or to the contract. The submission of a proposal shall be taken as prime facie evidence of compliance with this section.

7. WITHDRAWAL OF PROPOSALS

Any Agency may withdraw his/her proposal, either personally, by written request, or by telephone call followed by written request at any time prior to the scheduled closing time for receipt of proposals. No Agency may withdraw a proposal after the date and hour set for the opening thereof and before the award of the contract unless said award is delayed for a period exceeding 45 days.

8. INTERPRETATIONS OF PLANS AND DOCUMENTS

If any person who contemplates submitting a proposal for the proposed contract and is in doubt as to the true meaning of any part of the plans, specifications or contract documents, or finds discrepancies in, or omissions from the plans or specifications, he/she may submit to the District a written request for an interpretations or correction thereof. **The person submitting such request will be responsible for its prompt delivery not later than the date specified in the schedule of the events.** Any interpretation or correction of the contract documents will be made only by addendum duly issued and a copy of such addendum will be mailed, delivered, or sent via facsimile

machine receiving a set of such contract documents as well as posted on the District Purchasing page. The District will not be responsible for any other explanations or interpretation of the contract documents. No oral interpretation of any provision in the contract documents will be made to any Agency.

9. AGENCIES INTERESTED IN MORE THAN ONE PROPOSAL

No person, firm or corporation shall be allowed to make or file or be interested in more than one proposal for the same work unless alternate proposals are specifically called for.

10. AWARD OF CONTRACT

The formal award of contract is subject to the right, which is reserved by the District to reject any or all proposals, or any parts thereof and to waive informalities.

11. "OR DISTRICT APPROVED ALTERNATE" CLAUSE

Whenever a process, equipment or material is specified by giving the manufacturer's name, brand or number, it is understood that the words "or District approved alternate" follow thereafter unless "No Substitutions" is stated in Special Information/Instructions.

12. ASSIGNMENT OF CONTRACT

The Agency shall not assign this contract nor any part thereof, nor any monies due or to become due, without the prior written approval of the District.

13. TERMINATION FOR BREACH

In the event that any of the provisions of this contract are violated by the Agency the District may serve written notice upon the Agency of its intention to terminate such contract, and unless within 10 days after serving of such notice upon the Agency such violation shall cease, and satisfactory arrangement for correction be made, the contract shall upon expiration of said ten days case and terminate. In the event of any such termination, the District shall immediately serve notice thereof upon the Agency and the District may declare the Agency in default, and procure all material involved in the Contract from other sources and the Agency shall be liable to the District for any excess cost occasioned the District thereby.

14. COPIES OF REQUEST FOR PROPOSAL

Each Agency will be furnished one complete set of the specifications. Additional copies may be obtained by contacting the Purchasing Department of the District.

15. ANTI-DISCRIMINATION CLAUSE

The bidder agrees not to discriminate against any client, employee or applicant for

employment or for services because of race, color, religion, national origin, disability, marital status, sex, or age with regard to, but not limited to the following: Employment upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; selection for training; rendition of services. It is further understood that any Agency who is in violation of this clause shall be barred forth with from receiving awards of any purchase order from the District, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely.

16. **Bid Protest Procedures**

Procedure: A Bidder protesting for any reason, the procedure or award of the contract, shall submit cause in a written protest to be filed with the Business Services Department no later than three (3) business days after the date upon which bids are opened. The written protest shall include the name of the protesting Bidder, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, and the specific relief requested. The written protest shall be delivered to:

Highline School District #401 Business Services Department ATTN: MARK FINSTROM
15675 Ambaum Blvd. SW Burien WA 98166

Consideration: Upon receipt, the District will consider the protest. The District may, within three (3) business days of receipt, provide any other affected Bidder, the opportunity to respond in writing to the protest. If the protest is not resolved by mutual agreement between the protesting Bidder and the Business Services Department, the Superintendent of the District or designee will review the issues and promptly furnish a final and binding written decision to the protesting Bidder and any other affected Bidders, within six business days of the District's receipt of the protest. (If more than one protest is filed, the District's decision will be provided within six business days of the District's receipt of the last protest). If no reply is received during the six-business-day period, the protest shall be deemed rejected.

Waiver: Failure to comply with these protest procedures will render a protest waived.

Condition Precedent: Timely and proper compliance with and exhaustion of these protest procedures shall be a condition precedent to any otherwise permissible judicial consideration of a protest.

RFP 18/19-4

The DISTRICT is requesting proposals from firms or individuals (the Agency) for the purpose of providing product and services to the DISTRICT.

Responses must include Agency qualifications, general availability, and pricing for services for each section that is appropriate. Please make sure to indicate the section number(s) you are responding to.

Highline School District #401 is interested in receiving Request for Proposals (RFP) from qualified Local service providers to provide SWITCHES/SERVICES.

If you have questions regarding this material, or if you require additional information, contact Becky Mesker, Project Manager (DoTS) at Becky.Mesker@highlineschools.org. **Sealed proposals will be received in the Office of the Chief Technology Officer, 15675 Ambaum Blvd. SW, Burien, WA 98166 until 2:00 p.m. Local Time, February 22, 2019.** Faxed or e-mailed proposals are not acceptable.

Maximum 100 points

Evaluation Matrix

Criterion	Potential Points
Price of Eligible Product/Service	30
Net 60 day	20
Prior experience with district	20
Local Vendor	10
Flexibility of Terms, Schedule and Arrangements	10
Qualifications – SPIN/SPAC/experience	10
Total	100

Selection Process

Proposals will be evaluated based upon, but not limited to, related experiences of the respondents, knowledge of the District, and overall proposal content, as outlined in the Matrix.

Proposals will be reviewed by District personnel.

Given that two (2) different product/services are being sought, multiple awardees may be selected. It is also possible that one (1) provider may be able to perform both product/services, and in this instance only one awardee may be selected. It is also possible that only one (1) portion of this RFP will be awarded, products or services.

The District reserves the right to seek additional information and/or clarification from any Proposer, the right to reject any and all responses received with or without cause, the right to negotiate all final terms and conditions of any agreement entered into with any Proposer that submits a response and also to waive an irregularities or informality if deemed to be in the best interest of the District.

Limitations

Service Providers must have a current SPIN and SPAC number assigned to them from Universal Service Administrative Company (USAC).

References

Please submit three (3) references, relative to quality and scope of services requested for a similar venue. We reserve the right to interview these references regarding any part of this proposal request. Submit agency's name, contact name, phone, e-mail, and contract terms served.

Indemnification

Subject to the following conditions, the Service Provider(s) shall defend, indemnify, and hold harmless the Highline School District and their respective agents, employees, consultants, successors and assigns ("Indemnitee") from and against all claims, damages, losses and expenses, direct and indirect, or consequential, including costs and attorneys' fees incurred on such claims and in proving the right to indemnification, arising out of or resulting from any act or omission of the Service Provider(s), its agents, any of its Subcontractors of any tier, and anyone directly or indirectly employed by the Service Provider(s) or Subcontractors of any tier ("Indemnitor"). The Service Provider(s) will fully indemnify Indemnitee for the sole negligence of the Indemnitor. The Service Provider(s) will indemnify Indemnitee for the concurrent negligence of the Indemnitor to the extent of the Indemnitor's negligence. The Service Provider(s) agrees to being added by the Highline School District as a party to any arbitration or litigation with third parties in which the Highline School District alleges indemnification or contribution from an Indemnitor. The Service Provider(s) agrees that all of its Subcontractors of any tier will, in the subcontracts, similarly stipulate; in the event any does not, the Service Provider(s) shall be liable in place of such Subcontractor(s). To the extent a court or arbitrator strikes any portion of this indemnification provision for any reason, all remaining provisions shall retain their vitality and effect. Provided further that the Service Provider(s) agrees to waive its immunity under the Washington State Industrial Act (Title 51 RCW).

The District agrees that to the fullest extent permitted by law, the District will hold harmless, defend, and indemnify the proposer, its agents, employees, and the board members from any liabilities, penalties, losses, damages, claims, expenses, attorneys' fees, taxes, expenses of litigation, judgments, suits, liens, and encumbrances, without limitation, arising out of or resulting from the negligence by the District.

Accidents and Risk of Loss

The Service Provider(s) will be solely responsible for accidents and injuries to all persons or property caused by the acts or omissions of its officers, supervisors, agents, or employees.

Prevailing Wages

Pursuant to RCW 39.12, the performance of any worker associated with the contract shall be paid no less than the prevailing wages determined by the Industrial Statistician of the Department of Labor and Industries and all Prevailing Wage laws are followed within the chapter. Prior to entering into the contract, an approved Intent to Pay Prevailing Wages shall to be provided to the District.

Payment and Performance Bond

Prior to entering into the Contract, a Payment and Performance Bond must be provided in the amount equal to the full contracted amount.

Appendices

The following appendices are included:

- Appendix A
Inside Wiring/Fiber from MDF to IDFs
- Appendix B
MDF/IDF Switch Gear

HIGHLINE PUBLIC SCHOOLS NO. 401

SWITCHES/SERVICES BID NO. RFP 18/19-4

CERTIFICATION INFORMATION

I hereby certify that I have read and understood this Request for Proposal, General Information, and Evaluation of Proposals.

The undersigned agrees to furnish the enclosed services at the price stated, subject to the conditions and requirements of this proposal. The proposal must be signed by a person with authority to legally bind the bidder.

I certify that I am an authorizing agent of the firm referenced below and have legal authority to bind said company to the terms and conditions of this contract:

Legal Firm Name: _____

By/Title _____

Print Name/Title _____

Authorized Signature _____

Address _____

City _____ State _____ Zip Code _____

Telephone _____ Fax _____

Email _____

Dated _____

Please indicate the person to be contacted by the District concerning any part of this RFP or the proposal:

Name: _____ Title _____

Telephone: _____ Fax _____

Email: _____

There are two independent projects in this RFP. Those projects include the following:

- 1. Inside Wiring/Fiber from MFD to IDFs – See attached description – Appendix A**
- 2. MDF/IDF Switch Gear – See attached description – Appendix B**

Each project requires a separate and independent bid if bidder is interested in doing work or supplying product; however, no bidder is required to bid on both projects. By bidding on one project, the bidder is only bidding on one project and bound by that one project's requirements. Bidders may bid on both projects, but each project requires a separate proposal and has separate project requirements. It is also possible that only one (1) portion of this RFP will be awarded, products or services.

This RFP follows USAC's Erate guidelines. Bidders must have a current SPIN and SPAC and not be banned from the provision of services under USAC's guidelines. www.usac.org/sl contains all of the pertinent information related to qualifications. If a bidder does not have a valid and current SPIN and SPAC – do not respond to this RFP as that is a requirement.

The following Matrix will be used to score vendor submissions:

Criterion	Potential Points
Price of Eligible Product/Services	30
Net 60 day	20
Prior experience with district	20
Local Vendor	10
Flexibility of Terms, Schedule and Arrangements	10
Qualifications – SPIN/SPAC/experience	10
Total	100

INSIDE WIRING

Scope of Work:

- 12 Strand OM3 fiber cable, OM4 fiber cable or single mode fiber cable between MDF and each IDF as needed to ensure 10G transmission at each school, as required by distance.
- Fiber LIU's where needed
- OM3 Fiber connector panels as needed or single mode fiber connected panels as needed
- Blank panels as needed
- Terminate each strand of fiber installed
- Surface Mount Raceway and Conduit as needed
- Fiber Patch cable, as clarified in walk through:
 - 4 each singlemode LC to LC (increased depending on fiber pathway lengths)
 - 234 each Multimode OM3/4 50/125 LOF LC to LC (depending on length of pathways)
- Supply and install materials to support an open pathway, such as J-hooks and hangers where possible
- Create final documentation upon completion of project

Schools included: Beverly Park, Bow Lake, Cedarhurst, Gregory Heights, Hazel Valley, Hilltop, Madrona, Marvista, McMicken Heights, Midway, Mt. View, North Hill, Parkside, Seahurst, Shorewood, Southern Heights, White Center Heights, Cascade, Chinook, Pacific, Sylvester, Big Picture, Highline, Mt. Rainier, Evergreen, Tyee, New Start, and Valley View.

Specifics per school: During the required walk through (see RFP for Scheduled Dates for response and walk through), staff will present vendors with location of MDF and IDF(s).

Attached: Telecommunications Cabling System – Section 27 11 00 for Highline Public Schools Standards.

Inside Wiring Q&A is to be directed to Becky Mesker, Project Manager, Department of Technology Services via Becky.Mesker@highlineschools.org.

APPENDIX A**Inside Wiring/Fiber from MFD to IDF's**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Description: Work includes the following:
1. Horizontal Structured Cabling System Supporting:
 - a. Voice Networks
 - b. Data Networks
 - c. Wireless Networks
 2. Telecommunications Rooms and Spaces
 3. Building Automated Systems Infrastructure
 4. Manufacturer Certification
- B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.
- B. Codes and Standards:
1. Installation Standards: Comply with following standards for cable and equipment installations. Publications shall be latest issue and addenda:
 - a. NEC, National Electric Code.
 - b. NESC, National Electric Safety Code.
 - c. TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises.
 - d. TIA-568-C.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements.
 - e. TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standards.
 - f. ANSI/TIA-569-C, Commercial Building Standard for Telecommunications Pathways and Spaces.
 - g. TIA-606-B, Administration Standard for the Telecommunications Infrastructure of Commercial Building.
 - h. TIA/EIA-758-B, Customer Owned Outside Plant Telecommunications Cabling Standard.
 - i. TIA-862-A, Building Automation Systems Cabling.
 - j. IEEE 802.3-2000. Ethernet Standard.
 - k. BICSI 001, Information Transport Systems Design Standard for K-12 Educational Institutions.
 - l. BICSI Information Transport Systems Installation Methods Manual, 6th Edition.
 - m. BICSI Telecommunications Distribution Methods Manual, 13th Edition.
 2. Telecommunications contractor shall have read the above documents and shall be familiar with the requirements that pertain to this installation. The documents may be obtained from:
 - a. Global Engineering Documents, 15 Inverness Way East, Englewood, CO, 80112-5776, 800-854-7179, <http://global.ihs.com/>
 - b. BICSI, 8610 Hidden River Parkway, Tampa, FL, 33637, 800-242-7405, www.bicsi.org
 3. Materials:
 - a. UL listed and labeled. Install label to be visible.
 - b. Equipment: Regularly catalogued items of manufacturer and supplied as

complete unit in accordance with manufacturer's standard specifications with optional items required for proper installation unless otherwise noted in this section.

- c. Telecommunications connectivity and cabling independently tested to meet current TIA standards.

1.3 SUBMITTALS

- A. Comply with requirements in Division 01 and Section 260500.
- B. Telecommunications Pre-Construction Submittal:
 1. Submit in booklet form, with data arranged under basic categories, such as, certifications, personnel training, manufacturer warranty, products, test equipment and calibration, and similar items.
 2. Include typewritten index.
 3. Organize by specification infrastructure component sections described in Part 1 and Part 2 of this section.
 4. Include dividers with identifying tabs between categories with references to specification sections.
 5. Submit Product Data information sheets for coordination with item and model number to be used marked, showing ratings.
 6. Where more than one product is shown on a page, mark product with arrow or by other means to identify exact product or products being submitted by specific part number.
 7. Prepare optical fiber link loss budget calculation indicating anticipated attenuation loss of total optical fiber connection for intra-building and inter-building backbone connections between locations. Include cabling distances, termination connector loss values per manufacturer's maximum guaranteed loss values and splicing losses. Calculations shall be in numeric values in decibels (dBs).
 8. Include sample labeling for each of the following telecommunications infrastructure components:
 - a. Workstation device faceplate identification labeling. Include label per telecommunications room.
 - b. 110 cross-connect block wall fields for horizontal, intra and inter-building backbone terminations.
 9. Submit network test equipment including model number and serial number. Include proof of calibration by manufacturer.
 10. Submit resumes and certifications of technicians and project manager who will support this project. Certifications shall include:
 - a. Copper installation certification.
 - b. Approved manufacturer classes satisfactorily completed
- C. Test Reports:
 1. Prepare test reports and submit within 5 days after Substantial Completion. Submit to the Owner's Representative electronic copy of test results, including overall test summary report.
 2. Submit proof of calibration of network test equipment and permanent link adapters.
 3. Submit in PDF and LinkWare software formats.
 4. Submit on CD-ROM format.
 5. Include final copy of test reports on CD-ROM in each Operation and Maintenance Manual.
 6. A copy of the summary test sheets shall be provided in hard copy in each Operation and Maintenance Manual.
- D. Record Drawings:
 1. Keep complete set of telecommunications drawings in the job-site office to show actual installation of cabling and equipment during construction.
 2. Use of this set of drawings for recording as-built conditions.

3. Indicate where material, equipment, and system component are installed differently from that shown on the Drawings, clearly and neatly using ink or indelible pencil in color red during construction.
 4. Ten days after Substantial Completion, prepare electronic set of Record Drawings, incorporating changes during construction. Submit Record Drawings to the Owner's Representative for review and acceptance.
 5. Submit Record Drawings in AutoCAD→ Version 2010 or newer versions of software, or as approved by the Owner, and in PDF format. Bound architectural x-reference backgrounds to each drawing file. Request final architectural background drawing files that incorporate floor plan and program spaces numbering modifications.
 6. Submit electronic copy of Record Drawings in full-size PDF and AutoCAD format, on CD-ROM, in each Operation and Maintenance Manual.
- E. Include on CD-ROM in each Operation and Maintenance Manual test results, Record Drawings, and manufacturer warranty application form. CD-ROM shall contain folder index for each closeout submittals. Label on each CD-ROM shall contain the Owner's name, project site name, and building identification number.
- F. Submit closeout documentation to the Owner's Representative and Architect under provisions of Division 01 and this section.

1.4 RELATED REQUIREMENTS

- A. The provisions of the Agreement, including bonds and certificates, the General Conditions, and Division 01 specification sections apply to all work of this Section.
- B. Section 260510: Basic Materials and Methods
- C. Section 260533: Raceway Systems
- D. Section 260534: Outlet Boxes
- E. Section 260800: Electrical Commissioning

1.5 TELECOMMUNICATIONS INFRASTRUCTURE CONTRACT WORK

- A. General:
1. Include labor, materials, tools, equipment and services for installation as indicated on the Contract Documents.
 2. Coordinate Work with other trades for complete and operational system.
 3. Include supplementary and miscellaneous items, appurtenances, and devices incidental to and necessary for sound, secure, and complete installation, whether or not specifically indicated in the Contract Documents.
 4. Include open cabling support systems, ladder rack, and cable trays.
 5. Provide testing of horizontal copper connectivity and cabling infrastructure.
 6. Provide all project closeout documentation including but not limited to test result documentation, Record Drawings, manufacturer warranty applications, and certificates, and Operation and Maintenance Manuals.
- B. Provide complete installation of the telecommunications infrastructure including but not limited to:
1. Pathways including open cabling supports, ladder rack, and cable tray
 2. Firestopping materials
 3. Horizontal copper connectivity and cabling
 4. Horizontal and vertical cable management systems

5. Copper modular patch cords
6. Testing of the horizontal permanent link cabling systems
7. Labeling and identification

C. Substitutions: The substitution of products shall adhere to the requirements defined in Section 012500 – Substitutions.

D. Work and materials not included:

1. Wide Area Network equipment including routers, firewalls, modems, and ASAs.
2. Local Area Network equipment including hubs and switches.
3. Server hardware including application servers, Storage Area Network, application software, and virtualization software.
4. Desktop PC computing devices and equipment.

1.6 DEFINITIONS

Administration: Methodology defining the documentation requirements of a cabling system and its containment, the labeling of functional elements, and the process by which moves, additions, and changes are recorded

Bonding: Permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed

Cable: An assembly of one or more insulated conductors or optical fibers within an enveloping sheath

Cable run: Length of installed media, which may include other components along its path

Cabbling: System of cables, cords, and connecting hardware

Channel: End-to-end transmission path between 2 points at which application-specific equipment is connected including test cords and patch cords for a maximum total distance of 328 feet (100 meters)

Connecting hardware: Device, or combination of devices, used to connect cables or cable elements

Consolidation point: Location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways

Cross-connection: Connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end

Demarcation point: Point where operational control or ownership changes

Equipment room: Environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect

Ground: Conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of earth

Horizontal cabling: Distribution media that connects the telecommunications outlet/connector at the work area and the first piece of connecting hardware in the horizontal cross-connect

Horizontal cross-connect: Group of connectors that allows equipment and backbone cabling to be cross-connected with patch cords or jumpers

Infrastructure (telecommunications): Collection of those telecommunications components, excluding equipment, that together provides basic support for the distribution of information within a building or campus

Local area network (LAN): Standard industry term for a network installation that serves a relatively small area (for example, structured cabling installation serving a building)

Main cross-connect: Cross-connect normally located in the (main) equipment room for cross-connection and interconnection of entrance cables, first-level backbone cables, and equipment cables

Metropolitan area network (MAN): Data communications network that covers an area larger than a campus area and smaller than a wide area network

Modular jack: Female telecommunications connector that may be keyed or unkeyed and may have 6 or 8 contact positions

Outlet/connector (telecommunications): Connecting device in the work area on which a horizontal cable or outlet cable terminates

Patch cord: Length of cable with connectors on both ends used to join telecommunications circuits/links at the cross-connect

Patch panel: Connecting hardware system that facilitates cable terminations and cabling administration using patch cords

Pathway: Sequence of connections that provides connectivity between devices on a network or between networks on an internetwork; the vertical and horizontal route of the telecommunications cable; a facility for the placement of telecommunications cabling

Permanent link: Test configuration for link excluding test cords and patch cords for maximum total distance of 295 feet (90 meters)

Plenum: Compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system

Telecommunications Room: Enclosed architectural space for housing telecommunications equipment, cable terminations, and cross-connect cabling

Storage Area Network (SAN): Specialized high-speed network dedicated to the transport of data between storage devices and servers

Star topology: Network topology in which services are distributed from or through a central point

Telecommunications: Transmission, emission, and reception of signs, signals, writings, images, and sounds, that is information of any nature by cable, radio, optical, or other electromagnetic systems

Unshielded twisted pair (UTP): Cable made up of one or more pairs of twisted copper conductors with no metallic shielding; the entire assembly is covered with an insulating sheath (cable jacket)

Wireless access point: Stand-alone hardware device or computer wireless adapter with software that acts as a wireless communication hub for users of wireless devices to connect with each other and to bridge those devices to the cabled portion of the network

Wide area network (WAN): Data communications system that uses telecommunications circuits to link LANs that are distributed over large geographic distances

Wireless local area network (WLAN): Data communications system that uses using radio frequency technology, such networks transmit and receive data over the air, minimizing the need for wired connections; they combine data connectivity with user mobility

Work area (workstation): Building space where occupants interact with telecommunications terminal equipment

Work area cable (cord): Cable connecting the telecommunications outlet/connector to the terminal equipment

1.7 QUALIFICATIONS

- A. The telecommunications contractor performing work specified in this section is required to have special skills obtained by education, experience, or both. Bidders for telecommunications work specified in this section shall be telecommunications contractors, who may be a subcontractor to Division 26 subcontractor.
- B. Subcontractors bidding telecommunications work shall have a minimum of 7 years of experience in the construction, testing, and servicing of systems of the type and magnitude specified in this section. The subcontractor shall have completed at least 10 projects of equal or larger size to this project within the past five years.
- C. Telecommunications subcontractor shall be a certified installer of the telecommunications system and pre-qualified by the manufacturer for the purpose of offering the Applications Assurance warranty.
- D. Telecommunications subcontractor shall have direct access to the tools and test equipment required to complete the telecommunications work when the work is bid.
- E. Telecommunications project manager (in office) and superintendent (field) shall have 5 years of experience at project manager and superintendent levels, respectively, on completed telecommunications projects of like magnitude and complexity as to this project. Project manager shall be certified as a Registered Communications Distribution Designer (RCDD) through Building Industry Consulting Service International (BICSI).
- F. Field technicians who will work independently at any given time during the project on the structured cabling system shall have a minimum of 3 years' experience on completed telecommunications projects of like magnitude and complexity as to this project. Field technicians working at job site shall have completed a copper technician installation training class conducted by the warranting manufacturer or BICSI.

1.8 MANUFACTURER CERTIFICATION

- A. The structured cabling system shall be covered by an Application Assurance Warranty.
 - 1. Warranty shall cover passive telecommunications infrastructure copper and optical fiber connectivity and cabling products and performance for a minimum 25 years from date of installation registration, and will support existing or future applications as defined in the current TIA-568-C standards.
 - 2. Installation practices shall follow the installation guidelines and procedures specified in the manufacturer certified installer training course and current TIA standards.
 - 3. Approved manufacturer partner is Berk-Tek/ Ortronics (OASIS) solution based on the existing infrastructure.
 - a. Acceptable alternate manufacturer solution is Berk-Tek/ Leviton.
 - b. Acceptable alternate manufacturer solution is Superior Essex/ Ortronics (nCompass).
 - 4. Submit closeout documentation in accordance with the manufacturer warranty requirements to comply for acceptance of warranty. Documentation shall be submitted to the manufacturer including, but not limited to:
 - a. Manufacturer warranty application form
 - b. Compliance of the proper network test equipment and permanent link adapters
 - c. Electronic test results per cable port and a summary report of test results
 - d. Record Drawings with identification labeling in PDF format
 - e. Documentation shall be issued electronically on a CD-ROM, FTP site, or via email
 - 1) Submit manufacturer warranty application registration number to the Owner or Owner's Representative.

- B. The telecommunications subcontractor shall provide the original hard copy certificate for the Application Assurance Warranty to the Owner.

1.9 MAINTENANCE

- A. Deliver maintenance materials to the Owner as required by this section.
- B. Modular Patch Cords, Category 6: Furnish the following quantities, lengths, and colors: Deliver to the Owner 21 days prior to Substantial Completion. Include a signed transmittal to the Owner or Owner’s Representative for each type of patch cord, quantity, length, and color provided as part of the Final Acceptance.
 - 1. Manufacturer: Ortronics:

Item #	Manufacturer	Part Number	Quantity	Cable Length	Color	Description
1	Ortronics	ORAMC603A06		3'A0"	Blue	Data
2	Ortronics	ORAMC605A06		5'A0"	Blue	Data
3	Ortronics	ORAMC607A06		7'A0"	Blue	Data
4	Ortronics	ORAMC609A06		9'A0"	Blue	Data
5	Ortronics	ORAMC603A00		3'A0"	Black	Wireless AP
6	Ortronics	ORAMC605A00		5'A0"	Black	Wireless AP
7	Ortronics	ORAMC607A00		7'A0"	Black	Wireless AP
8	Ortronics	ORAMC605A04		5'A0"	Yellow	IP Camera
9	Ortronics	ORAMC607A04		7'A0"	Yellow	IP Camera
10	Ortronics	ORAMC605A03		5'A0"	Orange	Video Server
11	Ortronics	ORAMC605A07		5'A0"	Purple	File Server
12	Ortronics	ORAMC605A05		5'A0"	Green	VoIP Phones
13	Ortronics	ORAMC607A05		7'A0"	Green	VoIP Phones
14	Ortronics	ORAMC609A05		9'A0"	Green	VoIP Phones

PART 2 - PRODUCTS

2.1 OPEN CABLING AND DEVICE MOUNTING SUPPORTS

- A. J-Hooks for Horizontal and Backbone Cabling:
 - 1. J-hooks shall comply with TIA requirements for structured cabling systems and pathway supports. Galvanized finish. Provide all hardware and hanger rod supports necessary for secure mounting to the structure. Follow manufacturer’s recommendations for quantity of cables supported.
 - 2. Manufacturer is Erico Caddy:
 - a. J-Hook Support, Part No. CAT214Z34
- B. Circular Cable Retainer shall comply with TIA requirements for structured cabling systems and pathway supports. The cable retainers shall be of plastic material with rounded edges, plenum rated, utilize an easy-lock closure and an attachment base. Cable retainers shall be screwed into structure and shall not be attached with self-adhesive. Cable retainers shall only be utilized in spaces that are extremely tight and J-hooks do not have sufficient space to be mounted. Cable retainers shall only be utilized to support a maximum of 12 horizontal cables.

1. Erico Caddy Part No. CAT CR50
- C. Adjustable Cable Support shall comply with TIA requirements for structured cabling system. The following are the maximum number of cables per category that shall be authorized to route within a single pathway of adjustable cable supports: Augmented Category 6 – 96 cables; Category 6 – 144 cables; Category 5e – 192 cables.
1. Erico Caddy Part No. CAT425.
- D. Provide all accessories and mounting hardware required for a complete and working installation of open cabling supports.
- E. All tie wraps installed in the plenum spaces shall be plenum rated.
1. Panduit Part No. PLT2S-C702
- 2.2 COPPER HORIZONTAL CABLING
- A. Category 6 UTP cabling for interior spaces
1. Each horizontal cable shall be constructed from 23 AWG PE (non-plenum) insulated solid bare copper conductors formed into four individually twisted pairs with a crossfiller center spline and enclosed by a PVC thermoplastic flame-retardant (non-plenum) jacket in the color blue for all applications with the exception of the IP cameras and wireless access points. Cable shall be UL1666, IEC332-1, CMR (riser) rated unless otherwise noted.
 2. Cable diameter shall not exceed 0.23 inches.
 3. Each conductor shall have an impedance of $100 \pm 10\%$ / 100m.
 4. Each cable shall meet the most current technical characteristics of ANSI/TIA-568-C standard.
 - a. Wire map:
 - 1) Continuity to the remote end
 - 2) Shorts between any two or more conductors
 - 3) Reversed pairs
 - 4) Split pairs
 - 5) Transposed pairs
 - 6) Any other pair inconsistencies
 - b. Length
 - c. Insertion loss (Attenuation) 32.6dB/100m @ 250MHz
 - d. Near-end crosstalk (NEXT) loss 43.3dB/100m @ 250MHz
 - e. Attenuation to crosstalk ratio (ACR) 10.7dB/100m @ 250MHz
 - f. Equal-level far-end crosstalk (EL-FEXT) 24.8dB/100m @ 250 MHz
 - g. Power sum equal-level far-end crosstalk (PS-ELFEXT) 21.8dB/100m @ 250MHz
 - h. Power sum attenuation to crosstalk ratio (PS-ACR) 8.7dB/100m @ 250MHz
 - i. Power sum-near-end crosstalk (PS-NEXT) 41.3dB/100m @ 250MHz
 - j. Return loss (RL) 20.5dB/100m @ 250MHz
 - k. Signal return loss (SRL) 20.5dB/100m @ 250MHz
 - l. Propagation delay (PD) 72% nom
 - m. Delay skew (DS) 35ns/100m max
 - n. Balance (LCL/TCL) 30.0dB/100m @ 200MHz
 - o. Balance (EL-TCTL) 8.0dB/100m @ 20 MHz
 5. Manufacturer is Berk-Tek LANmark 1000:
 - a. CMR Riser, 10032455
- B. Category 6 UTP outside plant cabling for underground, slab on grade floor box and exterior spaces:
1. Each horizontal cable shall be constructed from 23 AWG insulated solid bare copper conductors formed into four individually twisted pairs with a crossfiller center spline and enclosed by a UV resistant polyethylene in the color black. Cable shall contain a gel- filled water resistant flooding compound.

2. Cabling shall be utilized per the NEC for use where pathways are routed within or below building slabs and foundations, in outside plant underground pathways and for aerial applications.
 3. Cable diameter shall not exceed 0.25 inches.
 4. Each conductor shall have an impedance of $100 \pm 10\%$ / 100m.
 5. Each cable shall meet the most current technical characteristics of ANSI/TIA-568-C standard.
 - a. Wire map:
 - 1) Continuity to the remote end
 - 2) Shorts between any two or more conductors
 - 3) Reversed pairs
 - 4) Split pairs
 - 5) Transposed pairs
 - 6) Any other pair inconsistencies
 - b. Length
 - c. Insertion loss (Attenuation) 32.8dB/100m @ 250MHz
 - d. Near-end crosstalk (NEXT) loss 38.3dB/100m @ 250MHz
 - e. Attenuation to crosstalk ratio (ACR) 5.4dB/100m @ 250MHz
 - f. Equal-level far-end crosstalk (EL-FEXT) 19.8dB/100m @ 250 MHz
 - g. Power sum equal-level far-end crosstalk (PS-ELFEXT) 16.8dB/100m @ 250MHz
 - h. Power sum attenuation to crosstalk ratio (PS-ACR) 3.4dB/100m @ 250MHz
 - i. Power sum-near-end crosstalk (PS-NEXT) 36.3dB/100m @ 250MHz
 - j. Return loss (RL) 17.3dB/100m @ 250MHz
 - k. Propagation delay (PD) 62% nom
 - l. Delay skew (DS) 45ns/100m max
 6. Manufacturer is Berk-Tek LANmark-6 OSP, Part No. 10139885
- C. Category 6 UTP UL Listed cabling rated for indoor/outdoor applications:
1. Cabling shall be utilized per the NEC for use where pathways are routed within or below building slabs and foundations.
 2. Each horizontal cable shall be constructed from 24 AWG PO (non-plenum) insulated solid bare copper conductors formed into four individually twisted pairs with a core separator.
 3. Cabling shall be NEC rated CM for general purpose communications in accordance with Article 800 of the National Electrical Code (NEC.)
 4. Cabling shall be fully water blocked with a flooded core and shall have a black sunlight resistant jacket.
 5. Cable diameter shall not exceed 0.271 inches.
 6. Each conductor shall have an impedance of $100 \pm 10\%$ / 100m.
 7. Each cable shall meet the most current technical characteristics of ANSI/TIA-568-C standard for category 6 cabling.
 - a. Wire map:
 - 1) Continuity to the remote end
 - 2) Shorts between any two or more conductors
 - 3) Reversed pairs
 - 4) Split pairs
 - 5) Transposed pairs
 - 6) Any other pair inconsistencies
 - b. Length
 - c. Insertion loss (Attenuation) 32.8dB/100m @ 250MHz
 - d. Near-end crosstalk (NEXT) loss 49/100m @ 250MHz
 - e. Attenuation to crosstalk ratio (ACR) 6.7dB/100m @ 100MHz
 - f. Power sum attenuation to crosstalk ratio (PS-ACR) 4.7dB/100m @ 250MHz
 - g. Power sum-near-end crosstalk (PS-NEXT) 40dB/100m @ 250MHz
 - h. Return loss (RL) 17.3dB/100m @ 250MHz
 - i. Delay skew (DS) 25ns/100m max

8. Manufacturer is Mohawk, VersaLAN, Part No. M58772

2.3 TELECOMMUNICATIONS WORKSTATION DEVICES

- A. Where indicated on drawings, telecommunications modules shall share a common faceplate. All four pairs of the UTP cable shall be terminated on each RJ45 module.
- B. Category 6 Modules:
 1. 8-Position 8-Conductor modules shall be Category 6, dual reactance technology, non-keyed, universal T568A/B, wired in accordance with the T568B pin configuration standard and used to terminate Category 6 UTP cables as specified herein. Module shall be high impact plastic housing, flame retardant UL 94V-O, modular contacts shall be beryllium copper, nickel plating under 50 micro-inches gold plating in contact area. IDC contacts shall be phosphor bronze, nickel under plating with tin lead over plate serving 22 through 24 AWG. Category 6 modules shall be in the color fog white and blank modules shall be in the color fog white unless otherwise specified for specific locations and applications. Provide colored icons on each module.
 - a. Manufacturer is Ortronics:
 - 1) Category 6 module
 - a) Color fog white, Part No. OR-TJ600
 - 2) Blank module in package of 10
 - a) Color fog white, Part No. OR-42100002
 2. Provide Wiremold Ivory color, Category 6, RJ-45 modules and blank modules for installation of modules in Wiremold V-2400 series raceway.
 - 1) Category 6 module
 - a) Color WM ivory, Part No. OR-TJ600-99
 - 2) Blank module in package of 10
 - a) Color WM ivory, Part No. OR-42100002-99
 - C. Flush and Surface Mounted Outlets:
 1. Faceplate:
 - a. Faceplate shall be single gang thermoplastic to hold four RJ45 modules.
 - b. Faceplate shall be fog white in color for thermoplastic style in flush mounted outlets and WM ivory for surface mounted outlets in Wiremold raceway.
 - c. Faceplate shall have recessed designation strips with clear plastic covers with the ANSI/TIA-606-B labeling standard.
 - 1) Manufacturer is Ortronics:
 - a) 4-port single gang thermoplastic, Part No. OR-40300546
 - b) 4-port single gang thermoplastic, Part No. OR-40300546-99
 - D. Power Pole, Floor Box or Poke-Thru Pedestal Bezel:
 1. Bezel types:
 - a. Bezel shall hold a maximum of four RJ45 modules.
 - b. Bezels mounted in floor boxes and poke-thru pedestals shall be fog white in color.
 - 1) Manufacturer is Ortronics:
 - a) 3-port stylistics bezel, Part No. OR-41900017
 - b) 4-port stylistics bezel, Part No. OR-41900018
 - E. Wireless LAN & Building Automated Systems Connectivity
 1. Surface Mount Interface Boxes
 - a. Where shown on drawings, provide surface mount interface box for interconnection of wireless access points devices (only above access ceilings) within the structured cabling infrastructure.
 - b. Surface mount interface boxes shall be thermoplastic base-plate with snap-on cover with capacity to hold two RJ45 modules.

- c. For wireless LAN access points thermoplastic interface boxes shall be utilized for non-plenum applications only. For plenum applications, provide a single gang metallic outlet box, color to match wall or ceiling with a single gang stainless steel faceplate.
- d. Surface Mount Interface Boxes shall be fog white in color.
- e. Manufacturer is Ortronics 2-port interface box, Part No. OR-404TJ2
- f. Wall mount wireless access point outlet locations shall be provided with single gang faceplate to hold up to four RJ45 modules.

F. Identification Icons:

1. Voice icons shall be in the color green.
2. Data icons shall be in the color blue.
3. All jacks to be data icons with a bag of 100 green voice icons to be given to owner.
4. Icons shall be mounted on each RJ45 module and on each associated patch panel port in the telecommunications rooms.
 - a. Manufacturer is Ortronics:
 - 1) Data icon, color blue, Part No. OR-40326200
 - 2) Voice icon, color green, Part No. OR-40325100

2.4 TELECOMMUNICATIONS ROOMS AND SPACES

A. Cable Management:

1. Rack Mounted Horizontal Cable Management:
 - a. Provide rack mounted horizontal cable management panels as indicated on applicable drawings.
 - 1) Manufacturer is Ortronics:
 - a) 2RU panel with vertical and horizontal distribution rings, Part No. OR-808004818.
 - b) 1RU panel with vertical and horizontal distribution rings, Part No. OR-808004759
2. Rack Mounted Vertical Cable Management:
 - a. Provide rack mounted vertical cable management panels with latches for securing cabling and patch cords to be provided in between and at the end of each Mighty Mo 6 equipment rack as indicated on applicable drawings.
 - b. Vertical cable management shall be 4-inches or 6-inches in width and shall be a height of 7'-0".
 - 1) Manufacturer is Ortronics:
 - a) 4" wide, 7'-0" high, Part No. OR-MM6VML704
 - b) 6" wide, 7'-0" high, Part No. OR-MM6VML706
3. Wall Mounted Cable Management:
 - a. 110 Jumper Troughs:
 - 1) Provide horizontal cable management, jumper trough with legs, mounted above and below each 100-pair or 300-pair 110 wiring block kit.
 - a) Manufacturer is Ortronics, Part No. OR-30200140
 - b. Provide flexible D-rings, as indicated on applicable drawings, and for routing and managing cabling on backboards.
 - 1) Manufacturer is Panduit:
 - a) Horizontal Cabling D-ring, Part No. CMVDR1S
 - b) Backbone Cabling D-ring, Part No. CMVDR2

B. Patch Panels:

1. Category 6 Modular Patch Panels:
 - a. Category 6, 8-Position 8-Conductor module, non-keyed, dual reactance technology, 110 type printed circuit board style patch panels, universal T568A/B, wired in accordance with the T568B pin configuration standard and used to terminate UTP cables as specified herein. Patch panels shall be high density, 6-

port modules, panel thickness at .125" aluminum with black powder coat finish; module shall be high impact plastic housing, flame retardant UL 94V-O, and fully encased protected printed circuitry. Modular contacts shall be beryllium copper, nickel under plating, 50 micro-inches of gold in contact area with IDC contacts phosphor bronze, nickel under plating with tin lead over plate, serving 22 through 24 AWG.

- b. Provide quantities and port configurations as indicated on the applicable contract drawings.
 - 1) Manufacturer is Ortronics:
 - a) 24 port patch panel, Part No. OR-PHD66U24
 - b) 48 port patch panel, Part No. OR-PHD66U48

2.5 PATCH CORDS

- A. Furnish quantities modular and optical fiber patch cords of color and length as indicated in Section 1.9, Maintenance.
- B. Copper
 - 1. Category 6 Patch Cords
 - a. Patch cords shall be constructed from Category 6 4-pair 24 AWG, stranded patch cable material.
 - b. Patch cord cable assembly shall be UL→ listed.
 - c. Patch cords cable shall meet FCC Part 65 plug and termination.
 - 1) Manufacturer is Ortronics:
 - a) Part No. OR-MC6xx-yy; where xx = length and yy = color
 - b) Colors shall be -00 for black, -03 for orange, -04 for yellow, -05 for green, -06 for blue, -07 for purple, -09 for white

2.6 BUILDING AUTOMATED SYSTEMS INFRASTRUCTURE

- A. Wireless Access Points, and IP CCTV Systems Connectivity and Cabling
 - 1. Category 6 UTP cabling premise
 - 2. Each horizontal cable shall be constructed from 23 AWG PE (non-plenum) insulated solid bare copper conductors formed into four individually twisted pairs with a crossfiller center spline and enclosed by a PVC thermoplastic flame-retardant (non-plenum) jacket in the color yellow. Cable shall be UL1666, IEC332-1, CMR (riser) rated unless otherwise noted.
 - a. Cable diameter shall not exceed 0.23 inches.
 - b. Each conductor shall have an impedance of $100 \pm 10\%$ / 100m.
 - c. Cabling shall be capable of terminating onto a modular 8-position, 8-conductor RJ-45 plug-ended direct attach at the workstation end device and shall terminate on a patch panel within the telecommunications room or space.
 - d. Each cable shall meet the most current technical characteristics of ANSI/TIA-568- C standard.
 - 1) Manufacturer is Ortronics.
 - a) CMR Riser, Part No. 10032461
 - 3. RJ-45 modular plugs:
 - a. Provide pre-approved Category 6 8-position, 8-conductor RJ45 plugs by the warranting manufacturer for the direct attach termination to solid conductor Category 6 cabling.
 - b. RJ45 plugs shall be compatible to be terminated on both Category 6 and enhanced Category 6 cabling.
 - c. RJ45 plugs shall be field terminated with a pre-approved termination tool. No other termination tools shall be authorized for the termination of these direct attach terminations.
 - d. Provide plugs in the color red for security CCTV connections.

- e. Plugs with a plastic boot shall be plenum rated when used in an air-plenum environment.
- f. Adhere to manufacturer's plug installation guidelines and testing procedures to ensure proper performance and signal transmission.
- g. Category 6 RJ-45 plug approved manufacturers are:
 - 1) Bel Stewart, Part No. SS-39100-022 (indicate the color red when ordering)
 - 2) Sentinel, Part No. 111-08080054L34 (indicate the color red when ordering)
 - 3) Allen Tel, Part No. AT8X8RCSC-24 (indicate the color red when ordering)
- h. RJ-45 termination tool approved manufacturers are:
 - 1) Bel Stewart, Part No. 2990003-01
 - 2) Sentinel, Part No. 90015
 - 3) Allen Tel, Part No. AT568 or AT582

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide suitable barriers and take any other safety precautions required by applicable codes.
- B. The working area shall be kept free from debris of all types and remove all rubbish resulting from their work on the premises. Upon completion, vacuum and clean room floors, equipment racks, enclosures and cable management where work has been performed.
- C. Telecommunications contractor shall be responsible for any building repairs made necessary by their work or caused by negligence of their employees. No cutting, notching, drilling or altering of any kind shall be done to the building without first obtaining permission from the Owner.
- D. The Owner may have other contracts in connection with this work for the installation of software and equipment for data, voice, wireless, video, and audio-visual applications. Telecommunications contractor shall provide other Trade Contractors reasonable opportunity for the introduction and execution of their work and shall properly coordinate other trade's work with theirs as required.
- E. Unless otherwise specified, legal and procedural conditions for the performance of work shall be consistent with those published in AIA Document A201 - "General Conditions of the Contract for Construction".
- F. Provide all patch panels and blocks shown on the telecommunications drawings whether or not they are fully populated with cables.
- G. Provide all cables, devices and equipment racking systems as shown on the contract drawings.

3.2 TELECOMMUNICATIONS ROOM EQUIPMENT INSTALLATION

- A. The primary function of a telecommunications room is the termination of horizontal, backbone and service entrance cabling to compatible connecting hardware.
- B. A telecommunications room also provides a controlled environment to house telecommunications equipment, connecting hardware, and splice enclosures serving a portion of the building.
- C. Provide telecommunications equipment including the following, but not limited to the following, and shall be installed according to the contract drawings:
 - 1. Cable management systems

2. Cross-connect patch panels and termination blocks, whether they are populated or not
3. Telecommunications workstation devices

- D. All 110 blocks shall be securely fastened to the backboards or equipment racks located in the telecommunications room. Provide all required D-rings or other approved cable guides as identified on the contract drawings.

3.3 OPEN CABLING SUPPORT INSTALLATION

- A. All cabling shall be run exposed as "open cabling" in ceiling spaces and ceiling plenums, unless otherwise noted
- B. Provide all hanger supports and cable supports for cabling specified in this section. All support structures shall adhere to the requirements in the National Electrical Code.
- C. Cabling supports shall be spaced no further than 4'-0" apart.
- D. Cabling bundles shall not sag a maximum of two inches from the bottom of the cable support.
- E. All cabling shall be bundled using Velcro in riser applications or plenum rated tie-wraps at mid-span in plenum applications.
- F. Provide all additional cable management products as required to protect exposed cabling and complete the installation of cabling in a neat professional manner.
- G. All floor penetrations shall be at columns, exterior walls unless otherwise specified.
- H. Cabling supports shall be installed on their own support system. The use of ceiling grid supports shall be prohibited.
- I. Do not support cables from ductwork, sprinkler piping, water piping, waste piping, conduit or other system supports. Cabling shall never come in physical contact with these mechanical, fire protection and electrical systems and raceways.
- J. Cabling bundles and supports changing pathway direction shall maintain proper bend radius as to not impact the physical jacket construction of the cabling. Cabling that becomes damaged during this transition shall be replaced in its entirety.
- K. Follow manufacturer's recommendations for quantity of cables supported in J-hooks and adjustable cable supports.
- L. Installers shall observe the applicable requirements and recommended good practices contained within ANSI/TIA-568-C standard for cabling installation requirements.

3.4 CABLING INSTALLATION

- A. Each telecommunications device shall be connected to the horizontal cross-connect in a telecommunications room with horizontal cabling installed in star topology.
- B. Horizontal cabling shall be installed in continuous runs from the telecommunications rooms to telecommunications device locations. Splices are not permitted.
- C. Maximum length of horizontal cables shall be 295 feet (90 m) including all service loops.

- D. All cabling shall be installed in accordance with manufacturer's recommendations, including but not limited to maximum tensile loading and maximum bend radius.
- E. Cabling shall be organized and identified so as to facilitate locating and handling individual sheaths for maintenance functions.
- F. Each bundle shall be neatly tied without cinching or stressing the cabling, using Velcro in open cabling installations and in the telecommunications room. Velcro shall be loose enough so that they can be easily rotated around the cabling bundle and does not impact the physical construction of the cabling.
- G. Bundles shall be clearly marked identifying the frame and terminal block to which routed, the station numbers served by the bundle, and any other information that may assist in administration.
- H. Provide machine typed label on both ends of the horizontal cabling jacket no more than 4- inches from each termination point.
- I. Great care shall be taken to protect all cabling from physical damage beneath floors, above ceilings or elsewhere. Cabling shall not be exposed to any forces or handling factors that will degrade performance, such as crushing, pull stressing, twisting, or damaging sheathing materials. When left unattended, all cabling shall be secured and protected to avoid damage.
- J. Velcro straps shall be utilized for all cabling bundles. Tie wraps are prohibited.
- K. A spare pull string shall be installed at every outlet installed.
- L. Horizontal cabling shall be bundled and routed separately in dedicated cabling supports in a neat and organized fashion for routing from the telecommunications rooms utilizing cable trays and open cabling pathways to the telecommunications devices.
- M. Route cabling runs from workstations parallel to building grid lines and directly to open cabling pathways without passing over adjacent office spaces or cubicles.
- N. Provide 10 feet of slack in neatly suspended loops above each workstation and 5 feet of slack neatly coiled in the ladder rack or cable tray in the telecommunications room unless indicated otherwise on contract drawings. Service loops in the telecommunications room shall not be located above the equipment racks and server enclosures.
- O. Trim all excess length from Velcro straps.
- P. Cables shall contact only dedicated and properly protected cable accesses and support mechanisms.
- Q. Telecommunications unshielded twisted pair cabling supported utilizing open cabling methods shall maintain a minimum separation of three inches from fire alarm, intercom/clock, paging, security and CATV broadband cabling. Cabling supports shall maintain increased separation requirements when attaching to the same hanger rod to ensure cabling sag maintains the minimum three inch separation.
- R. Maintain the following distances between cabling and other building systems:
 - 1. One foot from fluorescent lights.
 - 2. Six feet from motors and transformers.
 - 3. Three feet from water piping or other mechanical equipment.
 - 4. One foot from electrical conduits or other electrical equipment.

3.5 CONNECTIVITY AND CABLING INSTALLATION

- A. All cabling shall be dressed and terminated in accordance with the cabling installation requirements identified in ANSI/TIA-568-C, BICSI Telecommunication Cabling Installation Manual, and the manufacturer's documentation.
- B. Cabling entering the telecommunications room and routing on the ladder rack or cable tray pathway shall be separated into cabling bundles specific to the patch panel in which it will be terminated to. Cabling bundles shall be in increments of either 24 cables or 48 cables for Category 6.
- C. Cabling shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the equipment rack, enclosure or backboard.
- D. Cabling transitioning from ladder rack or cable tray pathway shall maintain proper bend radius utilizing waterfall device brackets for transitioning vertically down the side rail of an equipment rack or server enclosure as to not impact the physical jacket construction of the cable. Waterfall device brackets shall also be utilized for transitioning cabling to blocks mounted on plywood. Cabling that become damaged during this transition shall be replaced in their entirety.
- E. Cabling shall terminate from one side of each patch panel only. The cabling shall terminate from the alternate side for the next patch panel position below the previous patch panel termination and shall continue in this orientation for the entire duration of the number rack units per equipment rack.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support straps. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.
- G. The installation of RJ45 modules into faceplates and attaching of the faceplates to the wall shall ensure that the faceplate and modules are flush. The faceplate shall be secured to the wall but shall not be secured to the wall with such force as to bow the faceplate.

3.6 WORK AREA

- A. 4-pair UTP horizontal cabling shall be terminated on 8-conductor 8-position modular jacks located at each telecommunications device shown on the applicable contract drawings.
- B. Each telecommunications device shall be provided with 1, 2, 3 or 4, 8-Position 8- Conductor RJ45 modules as shown on the applicable contract drawings.
- C. RJ45 modules shall be mounted in faceplates attached to single gang or dual gang mud rings or other mounting bracket.

3.7 CABLING TERMINATIONS

- A. Provide all necessary installation materials, tools and equipment to perform insulation displacement type terminations at all the telecommunications outlets, patch panels and 110 cross-connect blocks.
- B. All pairs in each cable shall be terminated on a 110 block, modular patch panel or telecommunications modules in accordance with this specification.
- C. All cabling shall be terminated in accordance with the T568B pin configuration standard.

- D. Remove only as much of the cable sheath as is necessary to terminate the cabling on the connecting hardware.
- E. A maximum of 0.25" of cable pair twists shall be removed from a Category 6 cable. Cabling and terminations exceed these dimensions shall be re-terminated.
- F. At the horizontal station patch panel, the cabling shall terminate from the center of the 110 IDC termination.
- G. Terminate cabling in accordance with connecting hardware manufacturer's recommendations. All cabling shall terminate in numerical sequence.

3.8 FIRESTOPPING

- A. All cabling running through rated floors and walls shall be firestopped in accordance with the requirements within this Section.
- B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure).
- C. Any penetrations created by or for the contractor and left unused shall also be sealed as part of the contractor's scope of work.
- D. Firestop putty or pillows shall be used inside conduits and cable trays to provide a re-enterable system allowing telecommunications cables to be easily removed or added in the future.
- E. Firestop systems shall be UL Classified to ASTM E814 (UL 1479).
- F. All firestop systems shall be installed in accordance with the NEC and the manufacturer's recommendations and shall be accomplished in a manner acceptable to the local fire and building authorities having jurisdiction over this work.
- G. All firestopping sleeved devices shall be installed according to the manufacturer's recommendations including, but not limited to;
 - 1. Wiring devices shall be installed in locations where indicated on the contract drawings, arranged in a single or multiple sleeve formation at the height specified. Sleeves shall be installed a minimum of 24 inches above the accessible ceiling grid.
 - 2. Install the devices in strict accordance with the approved shop drawings and the manufacturer's recommendations.
 - 3. Apply the factory supplied gasketing material prior to the installation of the wall plates.
 - 4. Secure wall plates to devices per the equipment manufacturer's recommendations.

3.9 LABELING

- A. General:
 - 1. Labeling shall be in accordance with ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure.
 - 2. All labels shall be permanent typewritten labels produced by a labeling machine.
 - 3. Labels shall be installed on all cabling at each end. Ensure labels are securely fastened.
 - 4. All labels shall be located within 6 inches of cable termination and placed so they can be easily read.
 - 5. The font type for each type of label shall be Arial.
 - 6. Labeling information will be reviewed at the Pre-Construction Meeting.
 - 7. All labeling shall be completed prior to the substantial completion date of the project.

- B. Telecommunications Device Labeling:
1. Each telecommunications outlet shall be labeled in accordance with ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure and the Owner's standards.
 2. The label shall be produced to fit into the recess provided and covered with a clear plastic cover.
 3. The labeling shall be as follows for a tenant space with a single telecommunications room:
 - a. TR-1-1-1 where:
 - 1) TR= Telecommunications Room
 - 2) -1= Rack Number
 - 3) -1= Patch Panel Number
 - 4) -1= Port Number
- C. Patch Panel Labeling:
1. Station Patch Panel:
 - a. 48-port modular patch panels shall be labeled with sequential numbering starting with "01" for the topmost patch panel and moving downward to the bottom of the rack. Patch panel labels shall be affixed to the left hand side of the patch panel.
 - b. Horizontal cabling distributed from 24-port and 48-port station patch panels to wireless access points and IP CCTV cameras shall have a label in the designation strip space directly below the RJ-45 module identifying the device interconnect point. The designation label examples shall be "C-01", "C-02" and so on for cameras and "AP" for wireless access points.
- D. 110 Wiring Block Labeling:
1. Color coded 110 designation strips shall be clearly labeled to identify the voice cabling terminated on each wiring block.

3.10 TESTING

- A. Test procedures shall be as prescribed by the ANSI/TIA, Insulated Cable Engineers Association and the National Electrical Testing Association.
- B. Test Equipment:
1. The network testing equipment shall be a Fluke Networks DTX-1800 Cable Analyzer and shall have a certified calibration from the manufacturer within the past six months. Proof of calibration shall be provided with the product submittal. Test equipment shall be utilized to test horizontal and backbone cabling.
 2. New permanent link adapters shall be provided for the main test end and smart remote test end prior to the start of testing. New permanent link adapters shall be provided for every 1,000 tests. Proof of permanent link adapters shall be provided prior to the start of testing. Test adapter cords shall be coiled and stored as to prevent any twisting or kinking that will distort the accuracy recordings of the tests.
 3. The field tester and adapters shall be certified by an independent laboratory as meeting or exceeding Level IIIe as defined in ANSI/TIA-1152.
 4. The RJ45 test plug for the network testing equipment adapters shall be in range of values defined in Annex C with ANSI/TIA-568-C for Near-end Crosstalk, Far-end Crosstalk and Return Loss.
 5. The test equipment shall be able to test up to a 900 MHz frequency range.
 6. The test equipment shall be ISO 9001 certified.
 7. The telecommunications contractor shall maintain an electronic copy of the manufacturer's testing procedures in the job site office.
 8. The test equipment batteries shall be charged daily and a level of greater than twenty-five percent of capacity shall be maintained during the testing.
 9. The test equipment shall be calibrated daily before the start of testing.

10. Prior to testing of the entire structured cabling system, provide a sampling of 12 tests from the project site and submit to the Telecommunications Consultant and Owner's Representative to conduct a review of the network equipment tester setup and accuracy parameters. The Consultant shall provide approval after the review has been completed to continue with the testing of the project site. If the review of the sample test results indicate discrepancies and non-compliance, the contractor shall provide another random set of 12 tests for review to confirm the setup and configuration parameter issues have been resolved.
- C. Horizontal Cabling:
1. All horizontal cabling shall be certified to meet or exceed the permanent link performance specifications for Category 6 horizontal cabling as defined in ANSI/TIA-568-C.
 2. Certifications shall include the following parameters for each pair of each cable installed:
 - a. Building Identification
 - b. Cable Identification.
 - c. Date of test
 - d. Test equipment manufacturer and model number
 - e. Wire map
 - 1) Continuity to the remote end.
 - 2) Shorts between any two or more conductors
 - 3) Reversed pairs
 - 4) Split pairs
 - 5) Transposed pairs
 - 6) Any other miswiring
 - f. Length
 - g. Insertion Loss (Attenuation)
 - h. Near-end Crosstalk (NEXT)
 - i. Power Sum Near-end Crosstalk (PSNEXT)
 - j. Attenuation to Crosstalk Ratio (ACR)
 - k. Power Sum Attenuation to Crosstalk Ratio (PSACR)
 - l. Equal-level Far-end Crosstalk (ELFEXT)
 - m. Power Sum Equal-level Far-end Crosstalk (PSELFEXT)
 - n. Return Loss
 - o. Propagation Delay
 - p. Delay Skew
 3. All horizontal cabling shall be tested using a Permanent Link configuration as defined in ANSI/TIA-568-C.
 4. Testing shall be conducted with frequency range from 1MHz to 250MHZ.
 5. Permanent link testing headroom and Near-End Crosstalk (NEXT) shall have a minimum performance value of 5.0 dB or greater for Category 6 tests. Test reports with a result less than 5.0 dB, is marked with an asterisk (*) or fails, shall be documented identifying the reason for the test failure and a corrective action plan developed.
 6. After corrective action has been completed, the permanent link shall be retested.
 7. It is the Telecommunications Contractor's responsibility to ensure 100 percent of the network horizontal cabling system links pass all tests with the minimum acceptable headroom performance level of 5.0 dB or greater.
 8. The test results shall be organized by building identification and cable identification number. The test results shall contain the date and time of when each test was saved in the memory of the tester. The test results shall be recorded on a CD-ROM in both PDF and LinkWare software formats.

END OF SECTION

APPENDIX B

MDF/IDF SWITCH GEAR

Scope of Work: 152 MDF/IDF locations (see Schools included below for quantity per school) upgraded switches. See RFP for Schedule of response dates. This quantity is subject to adjustment based on available Category 2 funds available per school. Vendors will honor the pricing for what is purchased, separate from what is bid in the RFP. Responses should follow USAC's Eligible List of components. If Ineligible Items are included, these items are to be called out and priced out separately.

Schools included: Beverly Park, Bow Lake, Cedarhurst, Gregory Heights, Hazel Valley, Hilltop, Madrona, Marvista, McMicken Heights, Midway, Mt. View, North Hill, Parkside, Seahurst, Shorewood, Southern Heights, White Center Heights, Cascade, Chinook, Pacific, Sylvester, Big Picture, Highline, Mt. Rainier, Evergreen, Tyee, New Start, and Valley View.

Specifics per school: *Switch type and quantity are driven by the attached spreadsheet.* No installation work is required; however, vendors may submit an itemized installation proposal separate from the MDF/IDF Switch Gear proposal. If a vendor submits an installation proposal, the District is not obligated to proceed with that proposal; however, this is subject to Erate guidelines as well.

Only the hardware identified in Appendix B is required for this project.

Attached:

Current vendor products in use within the district include:

- Foundry – Used in support of administrative, non-instructional, instructional and public spaces (end of life)
- Cisco – Used in support of administrative, non-instructional, instructional and public spaces (some end of life)
- Allied Telesis – Used in support of non-instructional, instructional and public spaces
- Brocade – Used in support of administrative, non-instructional, instructional and public spaces (current product purchased)

According to USAC Guidelines, Highline School District #401 is posting the current product specifications under this RFP with equivalency support. The chart below includes Brocade hardware currently used within the school district, vendors may respond with equivalent products that meet or exceed the specifications of the devices outlined. All switches must be equipped to support 10GB, or higher, interconnectivity between MDF/IDF hardware and needs to be equipped with PoE.

MDF/IDF Q&A is to be directed to Becky Mesker, Project Manager, Department of Technology Services via Becky.Mesker@highlineschools.org.

Brocade ICX 6610 Switch

The Brocade ICX 6610 Switch redefines the economics of enterprise networking by providing unprecedented levels of performance, availability, and flexibility in a stackable form factor—delivering the capabilities of a chassis with the flexibility and cost-effectiveness of a stackable switch.

Brocade Hardware (currently in use)

ICX6610c48PcE	ICX6610 48PT POE EXH AIR FLOW
ICX6610c24PcE	ICX6610 24PT POE EXH AIR FLOW
RPS16cE	ICX6610 POE EcAF P/S
ICX6610cFANcE	EXHAUST DIRECTION FAN THE ICX6610
ICX6610c10GcLICcPOD	S/W PP 10G CAP BASED LIC ICX6610 4PT 10
ICX6610cSVLcNDPc1	1YR ESS NBD PARTS ONLY SUP ICX6610
10GcSFPPcLR	10GBASEcLR SFP+ LC SMF 10K
10GcSFPPcSR	10GBASEcSR SFP+ LC MMF 300M

Additional Specifications

ICX6610\24P\E	24cport 1 GbE RJ45 PoE+, plus 8x1 GbE SFPP uplink ports (upgradable to 10GbE). 4x40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Base software.
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CX6610\48P\E	48cport 1 GbE RJ45 PoE+, plus 8x1 GbE SFPP uplink ports (upgradable to 10 GbE). 4x40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Base software.
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More specifications can be found at:

<http://www.brocade.com/products/all/switches/productcdetails/icxc6610cswitch/specifications.page>

<http://www.brocade.com/products/all/switches/productcdetails/icxc6610cswitch/systemcoptions.page>

11/14/2018	District Data Switch Port Count				
SITE NAME	MDF/IDF Ct	Total Ports	Room	Switch Ct	Ports
BEVES	6	268	DMARC	1	1 - 48
			MDF	3	2 - 48 and 1 - 24
			IDF1	1	1 - 24
			IDF2	1	1 - 24
			IDF3	1	1 - 24
			IDF4	1	1 - 24
BOWES	4	360	MDF	3	3 - 48
			IDF1	4	4 - 48
			IDF2	1	1 - 24
			IDF3	1	1 - 24
CEDES	4	380	MDF	6	5 - 48 and 1 - 24
			IDF1	1	1 - 48
			IDF2	1	1 - 24
			IDF3	1	1 - 24
GREES	3	312	MDF	6	6 - 48
			IDF1	1	1 - 24
			IDF2	1	8
HAZES	3	276	MDF	6	5 - 48 and 1 - 24
			IDF1	1	24
			IDF2	1	8
HILES	6	276	MDF	1	48
			IDF1	1	48
			IDF2	1	48
			IDF4	2	1 - 48 and 1 - 24
			IDF5	1	48
			IDF6	1	24
MADES	3	260	MDF	5	4 - 48 and 1 - 24
			IDF1	1	48
			IDF2	1	8
MARES	4	492	MDF	6	8 - 48

			IDF1	1	48
			IDF2	1	48
			IDF3	1	16
MCMES					
	3	492	MDF	6	5 * 48 and 1 * 24
			IDF1	4	4 - 48
			IDF2	1	48
MIDES					
	5	412	MDF	4	4 - 48
			IDF1	4	3 * 48 and 1 - 24
			IDF2	1	48
			IDF3	1	12
			IDF4	1	12
MTVES					
	6	444	MDF	4	4 - 48
			IDF2	2	2 * 48
			IDF3	3	2 - 48 and 1 - 24
			IDF4	1	48
			IDF5	1	8
			IDF6	1	8
NORES					
	3	320	MDF	4	3 - 48 and 1 - 24
			IDF1	1	24
			IDF2	3	3 - 48
PARES					
	3	420	MDF	4	4 * 48
			IDF1	4	4 - 48
			IDF2	1	48
SEAES					
	7	236	MDF	4	3 - 48 and 1 - 24
			IDF2	1	24
			IDF3	1	8
			IDF4	1	8
			IDF5	1	8
			IDF6	1	16
			IDF7	1	8
SHOES					
	5	428	MDF	5	4 - 48 and 1 - 24
			IDF1	3	2 - 48 and 1 -24
			IDF2	2	1 - 48 and 1 -24
			IDF3	1	16
			IDF4	1	16

SOUES	4	194	MDF	1	48
			IDF1	1	1 - 48
			IDF2	3	2 - 48 and 1 - 24
			IDF3	1	16
WHITES	2	236	MDF	5	5 - 48
			IDF1	1	8
CASMS	7	420	MDF	3	2 - 48 and 1 - 24
			IDF2	1	48
			IDF3	1	48
			IDF4	2	2 - 48
			IDF5	1	48
			IDF6	1	24
			IDF7	1	48
CHIMS	7	356	MDF	4	3 - 48 and 1 -24
			IDF1	1	48
			IDF2	1	16
			IDF3	1	48
			IDF4	1	24
			IDF6	1	16
			IDF8	1	48
PACMS	5	284	MDF	3	3 - 48
			IDF1	1	48
			IDF2	2	1- 48 and 1 -24
			IDF3	1	24
			IDF4	1	24
SYLMS	12	628	MDF	4	3 - 48 and 1 - 24
			IDF1	1	24
			IDF2	3	2 - 48 and 1 -24
			IDF3	1	16
			IDF4	3	1 - 48
			IDF5	1	1 - 48
			IDF6	1	16
			IDF7	1	8
			IDF8	1	24
			IDF9	2	1 - 48 and 1 -24
			IDF10	1	24

			IDF11	1	24
BIGHS					
	4	152	MDF	1	48
			IDF1	1	48
			IDF2	1	24
			IDF3	2	32
EVEHS					
	10	686	MDF	3	2 - 48 and 1 - 24
			IDF1	2	2 - 48
			IDF2	2	2 - 48
			IDF3	1	48
			IDF4	2	48
			IDF5	1	48
			IDF6	1	24
			IDF7	1	48
			IDF9	1	24
			Lab 410	2	2 - 48
HIGHS					
	13	804	MDF	4	4 - 48
			IDF1	1	48
			IDF2	2	1 - 48 and 1 -24
			IDF3	3	2 - 48 and 1 -24
			IDF4	1	24
			IDF5	1	8
			IDF6	3	2 - 48 and 1 -24
			IDF7	1	16
			IDF8	1	24
			IDF9	1	8
			Lab 046	3	2- 48 and 1 - 24
			Lab 235	3	2 - 48 and 1 -24
			Lab 114	1	24
MTRHS					
	6	1068	MDF	7	7 - 48
			IDF1A	3	3 - 48
			IDF1B	3	3 - 48
			IDF1C	3	3 - 48
			IDF2A	3	2 - 48 and 1 -24
			IDF2B	4	4 - 48
NEWHS					
	5	176	GWY	1	48
			MDF	1	24
			IDF1	2	1 - 48 and 1 - 24

			IDF2	1	1 - 48
			IDF3	1	16
TYEHS	8	572	MDF	3	2 - 48 and 1 -24
			IDF1	1	24
			IDF2	1	24
			IDF4	2	1 - 48 and 1 -24
			IDF5	1	48
			IDF6	1	48
			IDF7	3	2 - 48 and 1 -24
			IDF9	3	3 - 48
VAL	4	168	MDF	1	48
			IDF1	1	24
			IDF2	1	48
			IDF3	1	48

152