FY2025 WAN RFP –
WESTWOOD COMMUNITY SCHOOL DISTRICT

E-rate BEN: 132292

470 # 250021473

Section 1: Project Summary

The purpose of this Request for Proposal (RFP) is to solicit bids for a Network Expansion for Westwood Community School District ("Applicant"). These requests are part of the E-rate filing for Funding Year 2025.

Timeline:

Task	To	Due Date
Form 470 and RFP posted	**EPC Portal**	**2/12/2025**
Clarifying Questions due	**jlutt@wcsdrebels.com cc to Erin@eratecomplete.com**	**2/19/2025 3pm Applicant time**
Q&A RFP Addendum Posted	**EPC Portal**	**2/19/2025**
Bids due via email	**Bids2025@eratecomplete.com**	**3/19/2025 3pm Applicant time**

Submission Requirements:

Failure to comply with RFP instructions may result in disqualification. **Inquiries asking the applicant to consider purchasing other services or components that are not included in the Form 470/RFP will not be considered legitimate inquiries or proposals. Questions that seek information readily available in the Form 470 or RFP will not be answered. No phone calls or texts; for documentation purposes all communication is required to be via email. Spam, generic, robotic and encyclopedic responses will not be considered legitimate bid inquiries or proposals.**

Clarifying Questions due from vendors to jlutt@wcsdrebels.com and cc to Erin@eratecomplete.com by 3pm applicant time 1/17/2025.

Questions received after this date will not be answered.

Bids must be submitted via email to Bids2025@eratecomplete.com and received by 3:00 pm Applicant time on 2/14/2025. All responses must be labeled **ATTN: ERATE FY2025 Response – Westwood Network Expansion**

Applicant reserves the right to reject late submissions.

SPIN: Interested bidders must provide their E-rate Service Provider Identification Number (SPIN/Form 498 ID) on the proposal response to be eligible for consideration and must be willing to certify their SPIN for FY2025. Failure to do so may result in disqualification.

Description of Proposal:

Respondent will provide a description of their proposal for all services and solutions. Description will include an overview of the proposal, any deviations from the requested architecture, design or requirements, assumptions made, other detail the applicant may find useful or necessary (or that could differentiate the solution from a competing proposal).

References:

For each response, respondent must provide 3 references from current or recent customers (preferably K-12 schools) with projects equivalent to the size of the applicant.

Required Notice to Proceed and Funding Availability:

Applicant will follow the purchasing policies of the School Board and requirements and procedures of the FCC's E-rate program as administered by the Universal Service Administrative Company to be eligible for all available funding. The implementation of any associated contracts resulting from this competitive bid process will be dependent on the applicant's issuance of a written Notice to Proceed and/or Purchase Order. E-rate funding notification alone will not signify Notice to Proceed. The applicant will have the right to allow the contract to expire without implementation if appropriate funding does not come available.

Invoicing: Respondents agree to conform to all E-Rate guidelines for the billing of discounts to the SLD. Bidders must be willing to provide E-Rate discounted billing (form 474/SPI invoicing) if requested by the applicant.

Prices to remain firm through E-rate approval, execution, and duration of the proposed contract. In the event of a price decrease for service or from the manufacturer, said decrease shall be passed on to the applicant and documented with new price sheet sent to the applicant contacts listed here.

Scope of Work

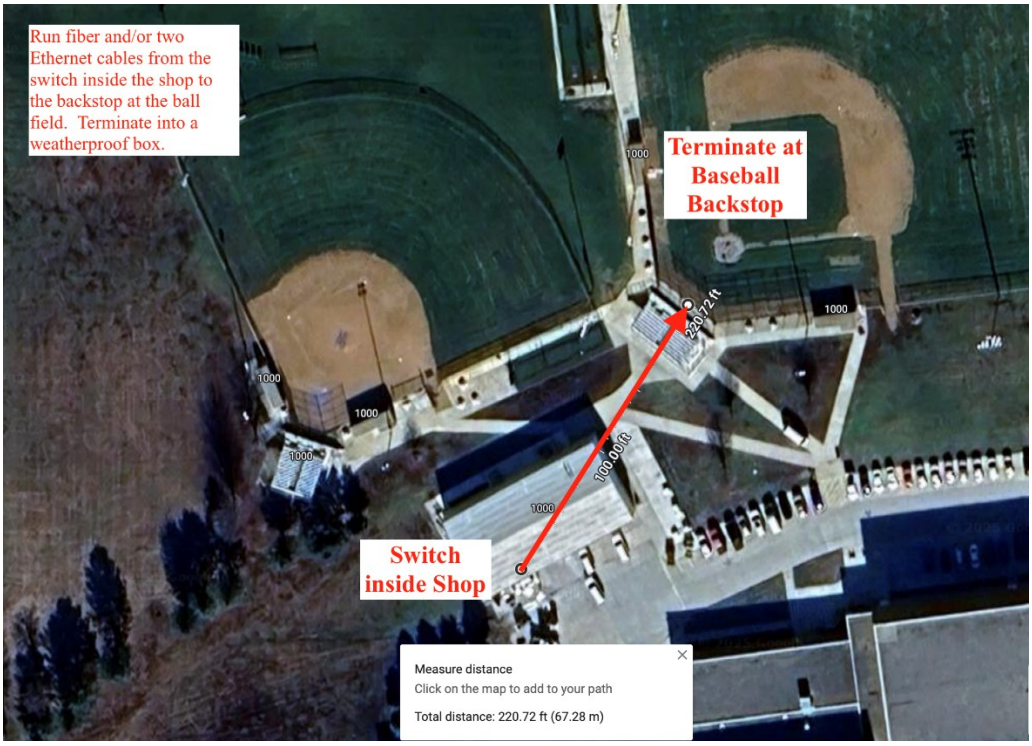
Applicant is soliciting proposals from Responders on WAN options as follows. Respondents may bid one, some or all options.

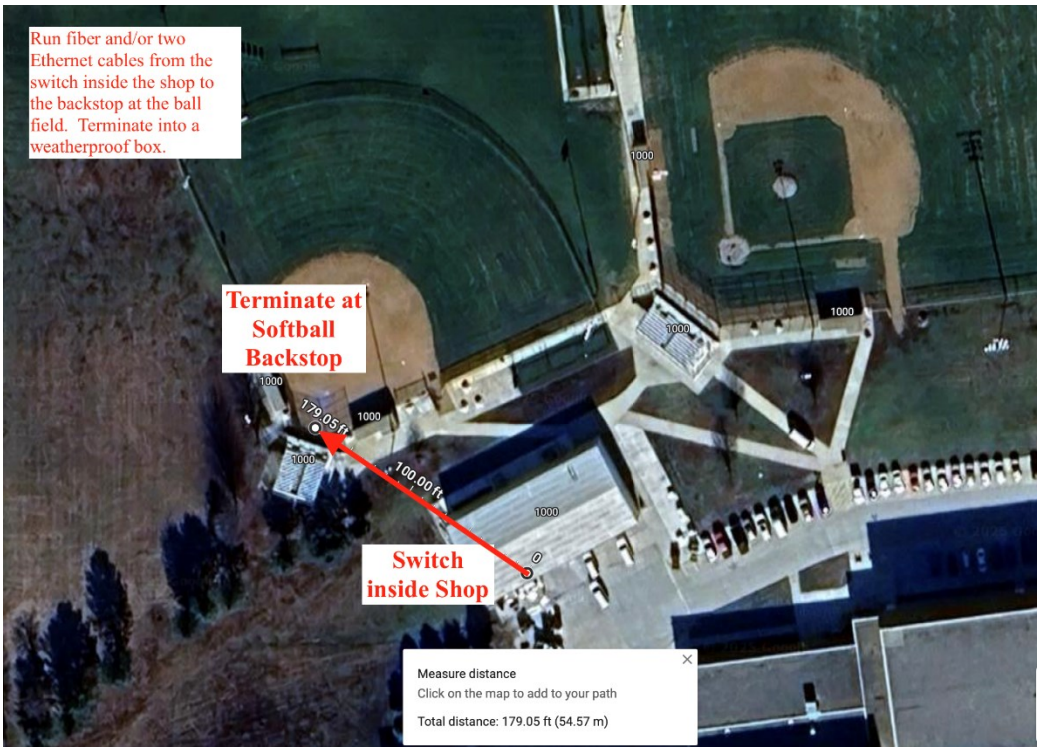
Site Addresses:

Network Hub: Westwood Community School District Bus Barn, 1000 Rebel Way, Sloan, IA 51055

1. Westwood Baseball Field
2. Westwood Softball Field

For illustration only – an example of a solution that might work.





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Section 2: Wide Area Network

1. Applicant is seeking bids for five (5) service offerings. Respondents may bid one, some, or all options. See Part 3 for requirements of each solution.
    a. The first service is a fully managed, leased lit fiber solution.
    b. The second service is a leased dark fiber solution with multiple contract options:
        i. A traditional, year to year lease that is billed monthly and includes fiber maintenance as part of this monthly recurring cost.
        ii. A long-term IRU agreement with one-time IRU fees paid up-front and fiber maintenance as a separate service. **The IRU agreement between Applicant and the fiber lessor will include terms outlining survivability of the IRU in case the lessor is acquired, insolvent, or experiences any change in ownership.**
    c. The third service is for a self-provisioned (applicant owned and operated) network.
    d. The fourth service is for technology neutral services provided over third-party networks. This is an E-rate Category 1 service option defined as point-to-point broadband service delivered over a service provider or other third party owned network. This service option is to represent any technology neutral third-party transport mediums including both fiber and non-fiber options. The service is a fully managed service, with the service provider supplying the equipment, provisioning the bandwidth and providing technical support/management of the service.
    e. The fifth service is for maintenance & operations on any self-provisioned network or leased dark fiber solutions.

2. Service Start Date
    a. Service start date will be July 1, 2025. Bidders must confirm in their response they can comply with the Service Start Date for any proposed solution.

3. Network Design and Construction Routes
    a. Applicant will consider traditional network designs (such as hub and spoke) or alternative proposals. The applicant's stated decision criteria (outlined in the RFP) will be used to determine if an award is made as-a-result of this RFP. The applicant will, in accordance with E-rate guidelines, rate cost of service as the highest weighted factor in its decision criteria.
    b. Due to current and future bandwidth needs, respondents are encouraged to provide dedicated infrastructure to Applicant. Designs are encouraged to utilize the private fiber approach, where there exists no other aggregation or third-party equipment on fiber strands between sites and modulating equipment at each site is dedicated to Applicant and not shared in any way with other customers. If this is not possible, then designs should limit the use of shared infrastructure as much as possible.

c. Respondents should clearly illustrate proposed network design and construction routes. Respondents should show evidence that they looked at alternate routes for the build and should provide narrative language supporting rationale for chosen build route(s).
d. Applicant is not advocating or mandating any preconceived network design or construction route and leaves this decision up to the vendor to present their best solution while recognizing the cited termination locations.

4. Special Construction
    a. In E-rate terminology, **special construction** refers to the upfront, non-recurring costs associated with the installation of new fiber to or between eligible entities.
        i. Special construction and service eligibility for reimbursement have changed starting funding year 2016. See the Federal Communications Commission E-rate modernization order 2 (WC Docket No. 13-184) (https://www.fcc.gov/document/fcc-releases-order-modernizing-e-rate-21st-century-connectivity) for more information.
    b. Special construction charges eligible for Category One support consist of three components:
        i. construction of network facilities
        ii. design and engineering
        iii. project management
    c. If no new fiber is being installed, then any installation costs are considered standard **non-recurring costs (NRC).**
        i. For leased lit fiber solutions requiring special construction, this means that the costs associated with building the fiber are considered special construction and the costs associated with the equipment required to activate the service are a standard NRC.
        ii. For leased dark fiber solutions, equipment required by the Applicant to light the fiber are not considered special construction.
    d. Special Construction Payment Plan Option
        i. The applicant requests that the respondents consider allowing Applicant to pay the non-discount share of special construction costs (portion of costs that are the responsibility of the applicant) to be paid in equal annual installments over four years from Funding Year 2025 to Funding Year 2028 inclusive. Responses must include agreement or non-agreement of this request.
    e. Excess fiber strands for special construction projects
        i. To the extent that the winning service provider installs additional strands of fiber for future business ventures, the winning service provider assumes full responsibility to ensure those incremental costs are allocated out of the special construction charges to the district in accordance with FCC rules and orders.
        ii. If, after the issuance of the FCDL, USAC or the FCC determines that the winning service provider did not cost allocate those charges associated with the additional

strands, Applicant will not be responsible for reimbursing the winning vendor and the winning vendor will assume all responsibilities deemed ineligible by USAC.

iii. For examples of cost allocation, please see document in Appendix A as prepared by the State E-rate Coordinators' Alliance (SECA).

Section 3: Solution Specifics

Part 1: Leased Lit Fiber WAN Circuits and Services Provided Over Third-Party Networks

a. Applicant must have dedicated, symmetrical transport bandwidth 1 Gbps between the designated endpoints.
b. The solution must be scalable to 10 Gbps.
c. Bids should include term options of 3, 5 and 10 years. Contracts with voluntary extensions will also be considered, but they may not continue in perpetuity. The resulting contract should include increases in levels of service and relevant pricing options should the applicant wish to increase bandwidth during the term of the agreement for the range specified above.
d. Each respondent is required to complete the attached pricing sheet with this RFP.
    i. Special construction, monthly recurring cost, and any additional non-recurring costs are **required** to be broken out and listed separately.
    ii. Respondents are free to propose alternate pricing terms provided they have also included pricing in the requested format.
    iii. No increased pricing will be allowed during the term of the quoted special construction, NRC, and MRC rate in each pricing cell of the matrix.
e. If a bandwidth upgrade is requested mid-contract the term length does not reset or renew. For example, if an upgrade occurs in month 20 of a 36-month contract, then 16 months of service must remain on the contract at the new bandwidth before a contract renewal is available.
f. All solutions must adhere to the following Service Level Agreement (SLA) terms and the terms found in Section 4:
    i. The provider will make all reasonable efforts to ensure 99.99% network availability of each circuit.
    ii. .25% frame/packet loss commitment
    iii. 25ms round trip network latency commitment
    iv. 10ms network jitter commitment
    v. There is no right of provider to limit or throttle the capacity of the circuit at any time for any reason
    vi. Vendor stated commitment is to respond to any outage within two (2) hours and a four (4) hour restoration of service.

Part 2: Leased Dark Fiber WAN Circuits:

a. Applicant must have two (2) strands (1 pair) of singlemode fiber from the hub to each eligible entity location.

b. Respondents are free to bid one or both contract options. It is not required to bid both.

c. Traditional leases

vii. Contract options are requested for 36-month, 60-month and 120-month terms of service. Contracts with voluntary extensions up to a total of 120 months will also be considered.

viii. Each respondent is required to complete the attached pricing sheet with this RFP.

1. Special construction and monthly recurring cost are **required** to be broken out and listed separately.
2. Respondents are free to propose alternate pricing terms provided they have also included pricing in the requested format.
3. No increased pricing will be allowed during the term of the quoted special construction and MRC rate in each pricing cell of the matrix.
4. Traditional leases require fiber maintenance as part of the MRC and must adhere to the terms in section 5.

d. IRU

i. A 10-year agreement is requested.

ii. Each respondent is required to complete the attached pricing sheet with this RFP.

1. Special construction, IRU fee, and monthly recurring cost for maintenance are **required** to be broken out and listed separately.
2. Respondents are free to propose alternate pricing terms provided they have also included pricing in the requested format.
3. No increased pricing will be allowed during the term of the quoted special construction, IRU fee, and MRC rate in each pricing cell of the matrix.
4. If special construction is required, Applicant expects significant reductions from prevailing market rates for the IRU fee and annual maintenance charges on all newly built segments.
5. Fiber maintenance should be quoted as a separate from the IRU fee.
    a. The fiber owner (not the district) must claim responsibility for repairs in the event of a catastrophic cut or relocate.
    b. Describe the process for relocates including assumption of costs.
    c. If maintenance cannot be quoted for entire time span of the IRU, please include alternate time span quote as well as explanation for the shorter time span.
    d. Maintenance must adhere to terms found in section 5.

e. The provider will make all reasonable efforts to ensure 99.99% network availability of all leased fiber strands.

f. All leased dark fiber solutions are subject to the terms found in Section 4.

i. Respondent shall maintain the applicable fiber seven days per week, twenty-four hours per day.

ii. In the case that maintenance is subcontracted out to a 3rd party, the respondent must hold and manage the subcontract and is ultimately responsible for the SLA.
iii. It is assumed that the dark fiber network is part of a more comprehensive fiber infrastructure of the service provider. The respondent will include only the portion of maintenance that is required to support the Applicant fiber segments versus overall network maintenance.
iv. Vendor commits to communication with applicant initiated within 24 hours of the outage notification, thereafter proceed to correct the malfunction with reasonable diligence.
v. The respondent should include an overview of maintenance practices including:
    1. Routine maintenance and inspection
    2. Scheduled maintenance windows and scheduling practices for planned outages
    3. Marker and handhole inspection and repair
    4. Handling of unscheduled outages and customer problem reports
    5. What service level agreement is included and what alternative service levels may be available at additional cost
    6. What agreements are in place with applicable utilities and utility contractors for emergency restoration
    7. Repair of fiber breaks and mean time to repair
    8. Replacement of damaged fiber and fiber that no longer meets specifications
    9. Post repair testing
    10. Policies for customer notification regarding maintenance
    11. Process for changing procedures, including customer notification practices
    12. Process for moves, adds, and changes
    13. Process for responding to locate requests

Part 3: Self-Provisioned Network:

This is an E-rate Category 1 service option defined as point-to-point broadband service delivered over a service provider or other third party owned network. This service option is to represent any technology neutral third-party transport mediums including both fiber and non-fiber options. The service is a fully managed service, with the service provider supplying the equipment, provisioning the bandwidth and providing technical support/management of the service.

Maintenance and operations monthly fees should be bid separately from the special construction charges for the self-provisioned network.

a. If a fiber option, applicant must have two (2) strands (1 pair) of singlemode fiber or ethernet cabling built from the hub to each eligible entity location.
b. Applicant intends to light two (2) strands (1 pair) to each site in the first year. USAC rules stipulate the following when any constructed strands will remain dormant in the first funding year in which they are constructed:
    ix. It must be proven that it is more cost effective to install the higher strand count

cable than one containing the exact number of strands being lit in the first year. OR

x. Cost allocation must be performed to list the percentage of cost of fiber material that will remain unlit as ineligible charges.
xi. See Appendix A, Part 2, Section A for examples.

c. If non-fiber, technology neutral solution, it must be scalable from 1 Gbps to 10 Gbps.
d. Each respondent is required to complete the attached pricing sheet with this RFP.
e. Applicant desires a fully "turn-key" project so respondents should provide explanation for Applicant's involvement in the process including ownership and sourcing of permits, etc.
f. Specifications for a newly constructed fiber infrastructure are contained in Appendix B: OSP Installation Specifications.
g. Selected respondent and its subcontractors will provide all project management to accomplish the installation of all project work as outlined in Appendix B.
h. Respondent is responsible for all necessary paperwork and obtaining all permits including but not limited to rights of way, easements, and pole attachments.
i. The respondent will provide engineer(s), certified on selected fiber system specifications and procedures to manage all phases of project as outlined in this proposal. This includes ordering and managing the bill of materials as outlined in Appendix B, directing and managing cable placement and restoration, directing and managing splicing crews and providing detailed documentation at the end of the project.
j. Selected respondent and its subcontractors will develop a project management plan, which will include a milestone chart. The milestone chart will outline any critical path events and then track these with the appropriate agency/organization whether; selected respondent, subcontractor or the district.

Part 4: Category 1 Network Equipment

Applicant is requesting Cisco SFP-10G-ER-S for each demarcation for any dark fiber or self-provisioned options.

Part 5: Maintenance & Operations

a. Applicant requires on-going maintenance of the fiber on leased dark fiber IRU or self-provisioned fiber solutions that includes routine maintenance and inspection, as well as unscheduled break/fix maintenance.
b. Contracts and price quotes are requested for 36-month and 60-month terms of service. Each respondent is required to complete the attached pricing sheet with this RFP.
c. Maintenance on self-provisioned fiber is being bid as a separate service and may be bid by anyone, even if they are not bidding on any fiber or network services.
d. Maintenance terms and conditions can be found below in section 5.

Section 4: Service Level Agreement

1. Network operations center: Solution will provide customer support functions including problem tracking, resolution and escalation support management on a 24x7x365 basis. Customer has the right and is encouraged to call concerning any problems that may arise relative to its connection with vendor provided services.

2. Trouble reporting and response: Upon interruption, degradation or loss of service, Customer may contact Vendor by defined method with a response based on trouble level. Upon contact from the Customer, the Vendor support team will initiate a response to resolve any Customer issue within 24 hours. Customer will receive rapid feedback on trouble resolution, including potential resolution time.
3. Escalation: If service has not been restored in a timely manner, or the Customer does not feel that adequate attention has been allocated, the Customer can escalate the trouble resolution by request. A list of escalation contacts will be provided when the implementation schedule is completed.
4. Resolution: The Customer will be notified immediately once the problem is resolved and will be asked for verbal closure of the incident.
5. Trouble reporting, escalation and resolution: A detailed trouble reporting, escalation and resolution plan will be provided to the district. Vendor should outline details on how to report an outage during business hours and outside of normal business hours.
6. Measurement: Time starts from the time the Customer contacts vendor and identifies the problem. Credits for outages should be the following:

Length of Service Outage	**Credit is the following** **percentage of monthly recurring cost**
Less than 2 hours	No Credit
Greater than two (2) hours and less than four (4) hours	5%
Greater than four (4) hours and less than eight (8) hours	10%
Greater than eight (8) hours and less than twelve (12) hours	15%
Greater than twelve (12) hours and less than sixteen (16) hours	20%
Greater than sixteen (16) hours and less than twenty-four (24) hours	35%
Greater than twenty-four (24) hours	50%

7. Reports: Upon request, an incident report will be made available to the Customer within five (5) working days of resolution of the trouble.
8. Link performance per segment: The service will maintain the proposed link performance throughout the term of the contract.
9. Historical uptime: Provide aggregate uptime statistics for your proposed service in the geographic area encompassing Applicant.

Section 5: General Terms for All Proposals

1. **Failure to include any requested information noted as required by the respondent is grounds for disqualification.**
2. All costs required to deliver the proposed solution must be included in the bid. By submitting a bid, the respondent certifies that it has engineered a full solution including all monthly recurring charges, all installation charges and all special construction costs. Costs added to the quote after the respondent has submitted their bid are solely the responsibility of the respondent and not the applicant.
3. Description of Proposal
    a. Respondent's proposal should include all sites for the option bid. If the respondent bids leased dark fiber or leased lit fiber – all sites must be included in the bid. Failure to include all sites in a bid option could be considered ground for disqualification.
    b. Respondent will provide a description of their proposal for all services and solutions.
    c. Description will include an overview of the proposal, any deviations from the requested architecture, design or requirements, assumptions made, and other detail Applicant may find useful or necessary (or could differentiate the solution from a competing proposal).
4. Reselling and subcontracting
    a. Any respondent who intends to resell or subcontract a lit service from a 3rd party must supply proof in writing that said party can provide service at all proposed Applicant locations.
    b. If, at any point following the bid submission, any changes from the 3rd party alter the costs or significantly change scope of proposed service then Applicant will not be liable for the cost increase and reserves the right to disqualify the bid and cancel any signed contracts without penalty.
5. Timeline
    a. For each response, respondents must include a timeline for bringing all sites online.
    b. Proposals must be able to bring all sites online by the July 1, 2025; the start of E-rate Funding Year 2025.
    c. For solutions requiring special construction, a schedule of bringing sites online must be included with an explanation of how this timeline shifts if the date of the E-rate funding commitment shifts.
6. Demarcation

a. All solutions must terminate service or infrastructure in the demarcation point at each address specified in the pricing sheet.
b. Solutions bringing service to the property line but not to the demarcation point are not acceptable.
c. Respondent must specify specific demarcation setup included in base fees, e.g. wall mounted CPE and CAT6a handoff, rack mount patch panel, etc.

7. Network Diagram
    a. For each response, respondents must include a network diagram displaying the paths to be used to serve each endpoint.
    b. Diagrams must show if circuits are routed through any aggregation hubs, equipment, or third-party facilities between hub site and each endpoint.
        i. If this detailed information cannot be supplied, then at a minimum the quantity of each must be supplied in order to provide a picture of potential latency.
8. E-rate Program Integrity Assurance (PIA) Review
    a. If their solution is chosen, respondents are required to promptly provide Applicant with any information being requested as part of PIA review.
    b. For all responses that include special construction, the respondent agrees to, by submitting its bid, produce all construction labor, construction materials and other cost information requested during PIA review.
    c. **All responses must agree, in writing, to this section with a yes or no answer. Answering no or failure to answer at all is grounds for disqualification.**

Section 6: Appendix A

E-rate Special Construction

Excess Strands - Cost Allocation Scenarios

Prepared by the State E-rate Coordinators' Alliance
October 23, 2017

I. LEASED LIT FIBER AND LEASED DARK FIBER

A. Excess Strands for Applicant's Future Use

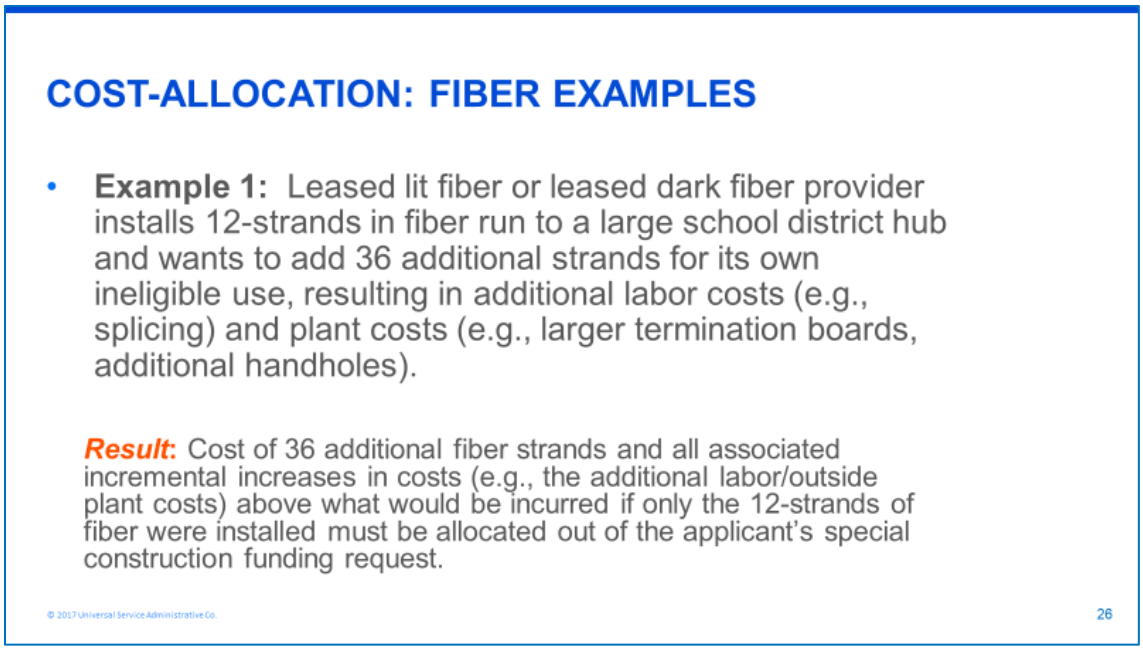
If the service provider installs additional strands for the applicant's exclusive future use in a leased dark fiber or leased lit fiber special construction project, and if the applicant can show documentation that buying a cable containing the number of strands placed in the fiber system for the applicant's future use is more cost effective then buying a fiber cable with the number of strands the applicant plans to place into service the first year, no cost allocation of the excess strands is required and no other special construction charges would need to be cost allocated.

If the service provider installs excess strands for the applicant's exclusive future use in a leased dark fiber or leased lit fiber special construction project where the excess strands will remain dormant until they are lit for the applicant in the future, and if the applicant cannot show that it is not more cost effective than buying the exact number of fiber strands being lit in the first year, the applicant must cost allocate the costs associated with the excess strands only. No other special construction charges would need to be cost allocated.

B. Excess Strands for Service Provider's Future Use

For lit services special construction and leased dark fiber special construction, if the service provider wishes to place extra strands in the build for its own use, the E-rate applicant must cost allocate the cost of the service provider-owned extra strands, as well as all incremental costs of those extra strands from the special construction E-rate funding request. It is not a pro-rata share, but an incremental cost calculation that must be backed by detailed documentation.

Example 1 from Funding Year 2018 USAC Fiber Training Slides applies:



Applicants should seek documentation from the provider which outlines the added incremental costs attributable to designing, managing and constructing a fiber system with a 48-strand cable instead of a 12-strand cable. Such costs should include (but are not limited to):

- Splice Labor. If any fibers over the applicant's fibers are spliced, the labor for these additional splices must be cost allocated.
- Splice Enclosures are placed to protect splices. If any fibers over the applicant's fibers are spliced and require an enclosure, the enclosures for these additional splices must be cost allocated.
- Fiber Installation Labor. This represents the incremental cost of pulling a larger cable through the buried conduit.
- Structured materials installation. This represents the additional cost of burying a larger conduit to support the additional fibers.

Note that the costs associated with installing a larger cable strand than what is required by the applicant are ineligible and the service provider should not include such costs in their special construction billing to the applicant but should be prepared to show evidence during PIA review that it did not charge the applicant for these incremental costs.

Figure 1: Here is a table outlining some possible incremental costs:

Item	12 Strand cable construction	48 strand cable construction	Cost Allocation Amount that service provider should remove from the special construction request
Fiber Cable	38 cents per foot	$1.04 per foot	66 cents per foot
Design and Engineering	$2.12 per foot	$2.42 per foot	30 cents per foot to depict additional splices at A and Z locations
Project Management	$1.18 per foot	$1.18 per foot	0
Splice labor*	$11.00 per splice	$11.00 per splice	$11 per splice over 12 splices at any splice site
Splice enclosures**	$205 per enclosure	$205 per enclosure	$205 per enclosure for every enclosure over 12
Fiber Patch Panel	$71.43 per panel	$218.60 per panel	$147.17 per panel
Conduit and other structured materials	1.25” conduit required $1.95 per foot Handhole (40,000 lb rated) $2695 per unit Fiber Marker $30 per unit	1.5” conduit required $2.35 per foot Handhole (40,000 lb rated) $2695 per unit Fiber marker $30 per unit	40 cents per foot No cost difference for handhole No cost difference per marker
Fiber Installation Labor ***	25 cents per foot	28 cents per foot	3 cents per foot
Structured Materials Installation (conduit, markers, handholes)****	$2.85 per foot	$3.10 per foot	25 cents per foot
Markers	Place every 500’	Place every 500’	No cost difference
Handholes	Place every 1000’	Place every 1000’	No cost difference

Section 7: Appendix B OSP Installation Specifications

Material Requirements

- Material will comply with those standards as established by UL or NEMA and shall be commercial grade. All materials will be new and free from defects.
- Selected contractor and its subcontractors will provide all material management to ensure that the project remains on track according to the project milestones,
- All due caution will be exercised in transporting and off-loading all materials to prevent any damage during shipping or placement. Any damage to any materials after their initial receipt and inspection by the respondent will be the sole responsibility of the respondent, who will replace such damaged materials at no additional expense to the district.
- Buried conduit shall be EMT (Electrical Metallic Tubing) multi-duct with at least three innerducts. EMT fitting shall be gland or set screw type, and each conduit shall be equipped with a graduated pull tape or rope.
- Unless specified by right-of-way owner, crossings will be two conduits, PVC-Sch 40 or better.
- The exact requirements for location and type of conduit within the building shall be verified with building owner.
- All Hand Holes shall be (State) DOT approved, 45,000 lb. load rated CDR or comparable enclosures on roadways and railways, and pedestrian rated hand holes for non-roadways and railways.
- Large-radius sweeps shall be provided where required for offset or change in direction of conduit. Bend radius rating of the cable must be adhered to for all conduit bends, pull boxes, and hand holes.
- Fiber must be single-mode with the following specifications:
    - TU-T G.652.C/D compliant
    - Maximum Attenuation @ 1310nm: 0.34 dB/km
    - Maximum Attenuation @ 1385nm: 0.31 dB/km
    - Maximum Attenuation @ 1550nm: 0.22 dB/km
- Connector types should be LC unless otherwise specified by the district.
- Any warranties associated with the fiber and any other outside plant materials must revert to the district as the fiber owner upon completion of construction,

Specifications

Survey

- Comply with all ordinances and regulations. Where required, secure permits before placing or excavating on private property, crossing streams, pushing pipe or boring under streets and railways. Pre-survey shall be done prior to each job.
- Respondent will locate underground lines of third parties in cable route area

Permits and Traffic Control

- The respondent must adhere to all applicable laws, rules and requirements and must apply for permits to place infrastructure per specification per county or city ordinance applicable to where the infrastructure is being placed.

- All traffic control, in accordance with local, state, county, or permitting agency laws, regulations, and requirements, will be the respondent's responsibility. The respondent's construction schedule will take into consideration sufficient time for the development and approval of a traffic control plan.

Tracer Wire Installation

- Tracer wire shall be placed with all conduit installed unless armored or traceable cable is used. The respondent will provide the tracer wire and shall install, splice and test (for continuity) the tracer wire. If the tracer wire is broken during installation, the wire should be repaired and tested for continuity after repair.
- For multi-duct installation, install a 5/8" X 8" copper clad ground rod in the hand-hole located on public right–of-way. Place a #12 insulated copper locate wire from the ground rod to the fiber optic termination room or to the outside of the building directly below the pull box and terminate on one side of an insulated indoor/outdoor terminal block to the master ground bar in the fiber optic termination room or place a ground rod on the outside of the building. Locate block in an accessible location. This is for "locate purposes only," not for grounding purposes. Note on as-built where ground is placed and tag located wire as "locate wire."

Depth of Burial

- Except where otherwise specified, the cable shall be placed to a minimum depth of 36" along roadways and 24" on private property. Greater cable depth will be required at the following locations:
    - Where cable route crosses roads, the cable shall be placed at a minimum depth of 48" below the pavement or 36" below the parallel drainage ditch, whichever is greater, unless the controlling authority required additional depth, in which case the greatest depth will be maintained.
    - Where cable crosses existing sub-surface pipes, cables, or other structures: at foreign object crossings, the cable will be placed to maintain a minimum of 12" clearance from the object or the minimum clearance required by the object's owner, whichever is greater.

Highway, Railroad, and Other Bored Crossings

- All crossings of state or federal highways and railroads right-of-way shall be made by boring and placing a pipe casing. The cable shall be placed through the pipe casing. Country road and other roadways shall be bored, trenched, or plowed as approved by the appropriate local authority.
- All work performed on public right-of-way or railroad right-of-way shall be done in accordance with requirements and regulations of the authority having jurisdiction there under.
- Respondent shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn.
- Where the cable route crosses railroad right-of-way, the cable shall be placed at a minimum depth of 60" below the railroad surface or 36" below the parallel drainage ditch, whichever is

greater, unless the controlling authority requires additional depth, in which case the greatest depth will be maintained.

Cable Markers

- Cable markers shall be placed within 48 hours of cable installation. Unless the right-of-way or property owner specifies otherwise, cable markers shall be placed at all change in directions, splices, fence line crossings, at road and stream crossings, and other points on the route not more than 1,000 feet apart.
- In addition, on highway right-of-way, the markers shall be located at the highway right-of-way line. Markers shall always be located so that they can be seen from the location of the cable.

Hand Holes

- Hand holes will be placed in accordance with standard industry practice following the specifications provided in the construction plans, typical drawings, and detail drawings. Special attention and planning must be exercised to ensure accessibility by other groups after construction has been completed.
- All hand holes unless otherwise stipulated by the drawings will be buried with 12" to 18" of cover at final grade.
- Immediately after placement, the soil around and over the hand hole will be tamped and compacted. Should any washouts occur, the respondent will be responsible for correcting the problem immediately without additional cost to the district.
- After cable placement, all ducts will be sealed.
- All splice hand holes/manholes will be grounded
- A minimum of 100' coil of cable shall be left in each hand hole/building for splicing use.

Splicing

- Fiber to fiber fusion splicing of optical fibers at each point including head ends is required.
- Complete testing services, such as end to end, reel testing, and splice loss testing, ORL, power meter/laser source testing and WDM testing is required.
- Individual splice loss will be 0.10 dB for single-mode unless after 3 attempts these values cannot be achieved, then the fibers will be re-spliced until a splice loss within 0.05 dB of the lowest previous attempts is achieved. Splice loss acceptance testing will be based on the fusion splicer's splice loss estimator.
- All cables to buildings shall be fusion spliced within a minimum of 50' of entering a building at a location to be determined by the owner with an existing single mode fiber and terminated at customer's rack.

Aerial Plant

- District is open to aerial fiber runs using existing utility poles, but respondent must adhere to pole owners' requirements for clearances, spans, grounding, guys and attachments.

Testing Cable

- The respondent shall be responsible for on-reel verification of cable quality prior to placement.
- Completed test forms on each reel shall be submitted to the district.
- Respondent assumes responsibility for the cable after testing. This responsibility covers all fibers in the cable.
- The respondent shall supply all tools, test equipment, consumables, and incidentals necessary to perform quality testing.
- The cable ends shall be sealed upon completion of testing.
- In addition to splice loss testing, selected respondent will perform end-to-end insertion loss testing of single-mode fibers at 1310 nm and 1550 nm from one direction for each terminated fiber span in accordance with TIA/EIA-526-7 (OFSTP 7). For spans greater than 300 feet, each tested span must test to a value less than or equal to the value determined by calculating a link loss budget.

Restoration

- All work sites will be restored to as near their original undisturbed condition as possible, all cleanup will be to the satisfaction of the district and any permitting agencies.
- Respondent shall provide a brief description of restoration plan in the response, with the expectation that a more detailed restoration plan will be delivered prior to construction beginning.
- Work site restoration will include the placement of seed, mulch, sod, water, gravel, soil, sand, and all other materials as warranted.
- Backfill material will consist of clean fill. Backfilling, tamping, and compaction will be performed to the satisfaction of the district, the representative of any interested permitting agency, and/or the railroad representative.
- Respondent will be responsible for any restoration complaints arising within one year after the district's final acceptance.
- Excess material will be disposed of properly.
- Debris from clearing operations will be properly disposed of by the respondent/subcontractors as required by permitting agencies or the railroad. Railroad ties, trees, stumps or any foreign debris will be removed, stacked, or disposed of by the respondent as per requirements by other interested permitting agencies, and/or the district.
- Road shoulders, roadbeds, and railroad property will be dressed up at the end of each day. No payment for installation will be permitted until cleanup has been completed to the satisfaction of any permitting agencies, and/or the district.
- Site clean-up will include the restoration of all concrete, asphalt, or other paving materials to the satisfaction of the other interested permitting agencies, and/or the district.

Documentation

As-built drawings will include:

- Fiber cable routes

- Drawings, site drawings, permit drawings, and computerized design maps and electronically stored consolidated field notes for the entire route must include:
    - Verification of as-built and computerized maps
    - Splicing locations
    - Optical fiber assignments at patch panels
    - Optical fiber assignments at splice locations
    - Installed cable length
    - Date of installation
    - Aerial installation documents should include
        - Pole attachment inventories
        - Pole attachment applications
        - Pole attachment agreements between respondent and other utilities
        - GPS points of reference for utility poles
        - Photo images of poles to which fiber is attached
    - Underground installation documents should include
        - Conduit design and detailing
        - Manhole detailing
        - Preparation of all forms and documentation for approval of conduit construction and/or installation,
- Fiber details will include:
    - Manufacturer
    - Cable type and diameter
    - Jacket type: singlemode
    - Fiber core and cladding diameter
    - Fiber attenuation per kilometer
    - Fiber bandwidth and dispersion
    - Index of refraction
- OTDR documentation will include:
    - Each span shall be tested bi-directionally from endpoint to endpoint.
    - Each span's traces shall be recorded and mapped. Each splice loss from each direction and the optical length between splices as well as any of the information required by Span Map.
    - Reel acceptance
    - Individual fiber traces for complete fiber length
    - Paper and computer disk records of all traces
    - Losses of individual splices
    - Anomalies
    - Wavelength tests and measurement directions
    - Manufacturer, model, serial number, and date of last calibration of OTDR
- Power Meter documentation will include:
    - Total link loss of each fiber
    - Wavelengths tested and measurement directions
    - Manufacturer, model, serial number, and date of last calibration for all equipment used

References, Standards, and Codes

Specifications in this document are not meant to supersede state law or industry standards. Respondents shall note in their response where their proposal does not follow the requested

specification to comply with state law or industry standard. The following standards are based upon the *Customer-Owned Outside Plant Design Manual* (CO-OSP) produced by BICSI, the *Telecommunications Distribution Methods Manual* (TDMM) also produced by BICSI, ANSI/TIA/EIA and ISO/IEC standards, and NEC codes, among others.

It is required that the respondent be thoroughly familiar with the content and intent of these references, standards, and codes and that the respondent be capable of applying the content and intent of these references, standards, and codes to all outside plant communications system designs executed on the behalf of the district.

Listed in the table below are references, standards, and codes applicable to outside plant communications systems design. If questions arise as to which reference, standard, or code should apply in a given situation, the more stringent shall prevail. As each of these documents are modified over time, the latest edition and addenda to each of these documents is considered to be definitive.

Table 1 — References, Standards, and Codes

Standard/Reference	Name/Description
BICSI CO-OSP	BICSI Customer-Owned Outside Plant Design Manual
BICSI TDMM	BICSI Telecommunications Distribution Methods Manual
BICSI TCIM	BICSI Telecommunications Cabling Installation Manual
	Customer-Owned Outside Plant Telecommunications Cabling Standard
TIA/EIA - 568	Commercial Building Telecommunications Cabling Standard
TIA/EIA - 569	Commercial Building Standard for Telecommunication Pathways and Spaces
TIA/EIA - 606	The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
TIA/EIA - 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
TIA/EIA - 455	Fiber Optic Test Standards
TIA/EIA - 526	Optical Fiber Systems Test Procedures
IEEE 802.3 (series)	Local Area Network Ethernet Standard, including the IEEE 802.3z Gigabit Ethernet Standard
NEC	National Electric Code, NFPA
NESC	National Electrical Safety Code, IEEE
OSHA Codes	Occupational Safety and Health Administration, Code of Federal Regulations (CFR) Parts 1910 - General Industry, and 1926 - Construction Industry, et al.