

## **ATTACHMENT A – Statement of Work**

Albuquerque Public Schools is soliciting proposals for a fiber optic wide area network solution for all locations identified in the Scope of Services below.

### **SCOPE OF SERVICES**

Owner will compare Lit Services, Leased Dark Fiber, IRU (Indefeasible Right of Use) Fiber, and self-provisioned fiber construction for district Wide Area Network (WAN) to meet the increasing bandwidth demands while reducing overall cost to the district. Proposals should include network electronics, Ethernet access switches / routers, modules, transceivers required to light the dark or self-provisioned fiber as well as maintenance of the self-provisioned fiber. The vendor must clearly identify the make, model, quantity, and unit cost for the proposed network electronics.

The current WAN for Albuquerque Public Schools consists of 159 sites currently all connected via a Lit Services of 300 and 500 Mbps to each location from the core Data Center on Oak St SE, A 2 Gbps circuit from the Core Data site to the uptown admin site. A 10 Gbps from the Core Data site to the AB3 Colocation site with internet connections of 2 Gbps burstable to 10 Gbps at both the core Data site and the AB3 Colocation site.

### **PROJECT BACKGROUND AND DESCRIPTION STATEMENT**

Schools today are increasingly dependent on internet-based curricula, software tools and educational content to deliver the best educational experience to all students. Portable devices that depend on cloud-based storage are becoming the standard, and because of such dependencies, bandwidth capacity and availability greatly determine how effectively our educators will be able to utilize the tools at their disposal to engage their students.

By the 2017-2018 school year, the State Educational Technology Directors Association (SETDA) has identified a target network bandwidth of 1 Mbps per student, a target that SETDA estimates will continue to increase as the number of devices and instructional programs become even more reliant on streaming and downloadable content. This ever-increasing need will be difficult to sustain financially without a robust and scalable network that can support it.

It is the goal of Albuquerque Public Schools to come up with a robust, reliable, scalable and cost efficient solutions to meet these needs. The district is willing to choose any of the alternatives below that will meet its needs in the most effective manner possible. The analysis of total cost will be made over a twenty-year period and vendors are encouraged to provide documentation that will facilitate a twenty year cost comparison. It should be noted that if the proposed solution includes the construction of fiber facilities these costs must be identified as special constructions as defined in the Funding Year 2017 Eligible Services List.

The district's goal is to ultimately meet the State Educational Technology Directors Association (SETDA) goals of 10 Gbps per 1,000 students. Over the next several years the district expects

its bandwidth to increase at the following rates and pricing for proposals should reflect the projected WAN growth as shown below in Chart A.

**Chart A: Projected WAN Growth Over Five Years:**

Year	Elementary Schools	Middle Schools	High Schools
2017	500	500	1000
2018	1000	1000	2000
2019	2000	2000	4000
2020	4000	4000	8000
2021	8000	8000	10000
Bandwidth in Mbps. For 2022 and forward district expects to require a minimum of 2 Mbps per user per site.			

Please note that there are also district administrative sites and those will require bandwidth within the ranges specified above. All sites are listed in Attachment B.

In order to meet the districts ultimate goal, the district would prefer a connection that is 1000 Gbps or greater (up to 10 Gbps), but is willing to consider any solution that provides an increase from the current 500 Mbps being delivered via Metro Optical Ethernet (MOE). The district desires a robust and scalable solution that will allow the district to increase speeds seamlessly.

The solution should, to the extent feasible, not include single points of failure. The district is willing to consider bids for lit leased services that provide pricing for incremental speeds between the speeds identified in Chart A. However, for purposes of comparing bids for leased lit services, dark fiber services, and self-provisioned services the district will only compare the price points identified in Chart A.

It is expected that all of the proposed solutions will require additional charges, including but not limited to, New Mexico Gross Receipts Tax, Universal Service Charges, and other eligible taxes. In the Cost Proposal the vendor is required to indicated whether their proposed pricing includes the fully loaded costs. If the cost provided by the vendor is not fully loaded the vendor must provide the expected percentage rate for these additional charges. For purposes of comparing bids the district will use the fully loaded cost. If the vendor does not include a fully loaded rate or an estimate of the eligible other charges and credits, the district will add 11% to the bid which is the current tax rate for the existing service.

In each building, Contractor must run infrastructure or service to an existing (TR / ER / MDF, etc.) designated by Owner. Proposals bringing service to the property line but not inside of the demarc address (TR / ER / MDF, etc.) are not acceptable. Site Diagrams to assist with the

location of TR / ER / MDF, etc. locations can be accessed at the following URL:  
<https://sites.google.com/a/aps.edu/aps-as-builts/home>

Owner is seeking proposals for the options listed below. For any options selected below, Contractors shall prepare separate proposals for one or more options. For example, if contractor would like to offer a solution for Leased Dark Fiber and IRU, a complete separate proposal will be required for both solutions.

The options are as follows:

#### **Lit Service**

The Owner must have dedicated Lit Transport Bandwidth throughput (upload and download) of 500Mbps, 1 Gbps, upgradable to 10 Gbps, between the designated endpoints. The proposed solution must be scalable from 500Mbps, 1 Gbps to 10 Gbps with 1 Gbps cost increments along with necessary backhaul links to transport current subscribe links. The district is willing to consider backhaul circuits in excess of 10 Gbps to meet increased capacity. If the proposal offers an oversubscribed solution it must be clearly stated in the response and a technical justification for the over-subscription rate must be provided.

#### ***Lit Service Price Proposal***

The “Fiber (Lit, Leased)” worksheet Attachment C includes columns for Contractors to provide 500 Mbps, 1G to 10G pricing (in 1Gbps increments), and 25 G for backbone circuits between the various endpoints. Price quotes are requested for 36 month, 60 month, 120 month and 240 month terms of service. Prices shall be all inclusive. In order to facilitate a fair comparison between the various services vendors are required to provide pricing that can used to calculate the total cost over a 20-year period. Failure to do so may result in the rejection of the proposal.

For **Leased Dark Fiber, IRU of Fiber, Self-Provisioned Fiber Construction** the following information applies:

In Funding Year 2017 the district expects to light two strands of fiber to each location. The district may request additional strands. Proposals should clearly identify the cost differential between various strand counts in the fiber. If the cost per foot for a higher strand count is less expensive the district may seek E-rate funding for the higher strand count. However, if the cost is higher the district may seek the higher strand count out of district funds. With the exception of core distribution sites that may require additional stands of fiber for backhaul links to transport the aggregated network traffic, the district would not expect to have more than 12 strands of fiber to each location. If the proposal offers an oversubscribed solution it must be clearly stated in the response and a technical justification for the over-subscription rate must be provided.

The Contractor shall provide a warrantee of all workmanship labor and materials along with manufacturer warranties.

This project should be broken down into logical phases to comprise the whole district when determining the Link routes – Paths. As-Builts, drawings – CAD and GIS are required upon completion of each phase.

The successful bidder will be required to work with the City of Albuquerque, Public Service Company of New Mexico (PNM), U.S. Army Corps of Engineers, One Call and other city/state entities. The successful bidder will be required to work with these entities to address easements, permits, construction of infrastructure for directional boring, use of utility poles, and other means of distribution of the OSP fiber optical cable and infrastructure to include all components, electronics and transmission equipment to connect to the existing routers at each site. Please note this list of tasks is not intended to be all-inclusive. The successful bidder will be required to work with these outside entities for any and all tasks associated with delivering a robust and scalable solution.

After award of contract, the contractor will be required to work with APS staff in each installation project through several stages, including but not limited to: final design, engineering, installation, testing, troubleshooting, maintenance, management, documentation and restoration.

The contractor must be experienced in OSP fiber optic installations of the type involved and must be able to provide references for similar work. If the vendor does not include references for similar work the proposal will be rejected. The contractor must provide documentation that any staff and subcontractors have the appropriate training and licensure to delivered the requests products and services. This includes, but is not limited to RCDD and Fiber Optic Engineers – design, technicians, splicers, OTDR testing ETC.

The options requested below are for a complete installation or utilization of OSP single mode Fiber backbone with Lit services to all of our TR / ER / MDF, etc sites IT rooms within the city of Albuquerque that will ensure a robust (VPLS preferred) Wide Area Network that limits single points of failure with the main APS data center at 930 Oak St SE as the core site. Vendor should provide network diagrams explaining their proposed solution whether it be full ring, partial ring, hub and spoke, etc.

In order to fully comply with E-rate rules and ensure the district receives a solution that will meet both its short and long term needs vendors may offer proposals on **Lit Service** as stated above as well as any or all of the options listed below. The evaluation of the price of E-rate eligible goods and services will be based on the total 20 year cost of ownership, lease, or service to the district.

**Leased Dark Fiber**

Contractors can quote a leased dark fiber network solution between the designated endpoints as listed in Attachment B.

***Lease Price Proposal***

Each Contractor is required to complete the pricing as listed in the “Leased Dark Fiber” tab in the APS\_Cost\_Response\_Form pricing matrix. (Attachment C)

### ***Additional Description***

Each leased dark fiber response must also include description of proposal, description of maintenance, SLA, timeline, network diagram, demarcation, references, and Connect America Fund status. Maintenance costs must be broken out from construction costs and described as such.

#### **IRU of Fiber**

Contractors shall quote a five, ten, 15-year, and, 20-year infeasible right to use (IRU) price for fiber between the designated endpoints as listed in Attachment B.

TERM: APS reserves to right to procure the services/goods as described in this RFP and enter into a contract not to exceed a total of eight (8) years. Please note the district is requesting pricing for a twenty year period and if allowable under State law, as determined by the district's counsel, the district reserves the right to enter into a contract in excess of eight (8) years. The District will determine which is most advantageous and in the best interest of the District. **APS reserves the right to award the best option that is in the Districts best interest.**

### ***IRU Price Proposal***

Owner is interested in IRU-type pricing with a one-time capital cost payment for the five, ten, and, 15-year, and 20-year infeasible right to use combined with “all-in” recurring payments for maintenance costs for the entire length of the IRU.

Contractor is required to complete the pricing as listed in the “IRU” tab in the APS\_Cost\_Response\_Form pricing matrix. (Attachment C).

If special construction charges are requested by the vendor for the fiber proposed to be IRU'd, Owner expects significant reductions from prevailing market rates for the IRU fee. Each IRU response must also include description of proposal, maintenance, SLA, timeline, network diagram, demarcation, references, and Connect America Fund status. Maintenance costs must be broken out from construction costs and described as such.

#### **Self-Provisioned Fiber Construction**

Owner requests that Contractors propose design and pricing for a self-provisioned new build of fiber between the designated endpoints as listed in Attachment B.

Contractors shall provide a proposal for an Owner owned fiber network based on a special construction project. New eligible fiber special construction charges as defined by the E-Rate Modernization Orders include construction, design, engineering and project management. Project management should include all necessary paperwork and permits including but not limited to rights of way, easements, and pole attachments. The Owner desires a fully “turn-key” project so Contractors shall provide explanation for the Owner involvement in the process.

### ***Self-Provisioned Fiber Construction Price Proposal***

Contractor is required to complete the pricing as listed in the “District-owed Fiber” tab in the APS\_Cost\_Response\_Form-Attachment-C pricing matrix. (Attachment C). The solution shall include all costs related to the deployment of the proposed circuit. Any additional costs, such as pole lease, etc. and/or recurring costs due after fiber installation shall be itemized and included.

The District will require on-going maintenance and operations of the fiber for at least the first five years. When pricing maintenance and operations, the Respondent should include an overview of fiber maintenance practices including:

- Routine maintenance and inspection,
- Scheduled maintenance windows and scheduling practices for planned outages,
- Fiber monitoring including information on what fiber management software is used, what fiber monitoring system is used, and who performs the monitoring,
- Handling of unscheduled outages and customer problem reports,
- What service level agreement is included, and what alternative service levels may be available at additional cost,
- What agreements are in place with applicable utilities and utility contractors for emergency restoration,
- Repair of fiber breaks,
- Replacement of damaged fiber,
- Replacement of fiber which no longer meets specifications,
- Policies for customer notification regarding maintenance,
- Process for changing procedures, including customer notification practices;
- The pricing for fiber maintenance should include the annual cost per linear mile for dark fiber maintenance and operations.

Maintenance costs must be broken out from construction costs and described as such.

#### **Network Electronics for Dark Fiber (Lease or IRU) and Self-Provisioned Fiber**

Contractor is required to submit bids for the modulating electronics required to light the dark or self-provisioned fiber. The proposed solution should be turn-key and provide all of the components required to light the fiber including, but not limited to: LED/Laser fiber optic transceivers, routers, layer 3 switches, associated software, installation, and associated taxes.

The contractor is required complete the pricing matrix on tab Electronics-10G on Attachment C - APS\_Cost\_Response\_Form in order to provide pricing for the electronics required to light the fiber at 10 Gbps. The contract may also offer pricing for electronics that will light the fiber at speeds in excess of 10 Gbps and should do so by completing the tab labeled Electronics- Beyond 10 G on Attachment C - APS\_Cost\_Response\_Form. If the contractor does offer pricing for electronics that go beyond 10 Gbps the contractor must clearly indicate the speed the electronics can support.

The pricing tab requests the following data elements for each component being proposed by the vendor:

Make	Model	SKU	Unit Cost	Quantity	Extended Cost	E-Rate Eligibility Percentage	E-rate Eligible Cost	E-rate Ineligible Cost
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The relevant attached allows the vendors to identify six specific pieces of required equipment per location. If additional pieces of equipment are required the vendor should add in the data elements (above) for each additional piece of equipment. Additionally, the contractor must also provide the following cumulative costs for all pieces of equipment proposed for each location:

Eligible Costs	Installation	Ineligible Costs	Installation	Other Eligible Fees (Taxes)	Other Ineligible Fees
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If the contractor proposes different modulating electronics for hub sites (proposed by the contractor), the contractor should clearly indicate such in the tab labeled Electronics- Beyond 10 G on Attachment C - APS\_Cost\_Response\_Form.

**Attachment B – APS Site Locations**

**Attachment C - APS\_Cost\_Reponse\_Form**

**See Attachment D - Standards for Self Provisioned Fiber Construction** for References, Standards, and Codes that are required.

**Attachment E – Fiber Details for USAC Review (Must be completed for all special construction charges)**