Bay Springs Telephone Company, Inc.

Smith County, MS Community Broadband NTIA Project

Request for Proposal
Engineering services on a fiber construction project

Response: Respondents are not entitled to rely on any verbal clarification or response from anyone in connection with this RFP. Respondents should send inquiries or quotes for materials to Lisa Wigington at LisaW@tec.com. Final RFP due by October 14, 2022.

Description of Project: The Smith County Community Broadband Project Phase 2 proposed funded service area covers approximately 132 square miles of rural Smith county in central Mississippi. This project will bring approximately 126 miles of core fiber to some of the most rural areas of Mississippi and make high speed broadband available to approximately 1,029 locations through fiber to the home technology.

Detailed Description of Existing Operations: Standards based, RUS approved, technology is used, and the network has been constructed using RUS standard construction practices. BST currently has 131 remote concentrators (Adtran TA5000) positioned throughout its network. BST is serving all of these remotes with fiber to the node (FTTN).

Each central office and remote has been upgraded beginning in 2019 and through the 2021 budget cycle as unfunded. The access equipment has already been upgraded to take the network from 1 GB core to 10 GB on all fiber fed COTs and remote upgrades were ongoing in 2020 and 2021. Approximately 97% of the census blocks included in the serving area are utilizing the existing copper plant. Utilizing ADSL2+ and VDSL2 technology in the remotes, this copper plant is being bonded, where there is enough copper available, to provide 25.0/3.0 broadband service up to 8,000 feet of the remote concentrators. Each serving remote has been constructed with carrier grade DC power plants and batteries with at least 8 hours of backup in the event of a long-term power outage. All sites are monitored by remote alarm systems and alarms are responded to 24X7 by on-call and network operations center (NOC) personnel. If the commercial power were to be affected for an even longer period, TEC can provide longer-term temporary power via fixed or portable generators as necessary. A detailed disaster recovery plan is on file and updated annually.

Approximately 3% of the census blocks included inside the service area are being served by a fiber to the home network design. The equipment strategy for any expansion project is to leverage existing fiber and continue it to deploy a Gigabit Passive Optical Network (GPON) Fiber to the Home (FTTH) solution using the Adtran TA5000 platform. Customers served via GPON have access to an aggregate of 2.4 Gbps bandwidth in the downstream direction and 1.2 Gbps upstream from the Optical Network Terminal (ONT) at their home through distributed optical splitters to the serving remote Optical Line Terminal (OLT).

This GPON capacity will easily scale to provide Gigabit service for these customers. However, if more bandwidth were to be required, NG-PON2 or XGS-PON at 10 Gbps or Point to Point 10 Gbps connections or higher could be deployed on an as-needed basis over the proposed Fiber optic cable. Latency within the proposed Adtran FTTH equipment ranges from microseconds to around 3-5ms, depending on location and distance from the master node.

The middle mile architecture for this project will utilize high-capacity transport rings and redundant link aggregation interfaces for a highly scalable and redundant network. The network will utilize a redundant 100 Gbps (scalable to higher speed on some links and lower on others) transport ring comprised of carrier grade ADTRAN and Cisco Ethernet aggregation switches (or equivalent) with full layer 2.5 and MPLS capabilities. Each optical light terminal is connected in a redundant fashion to different parts of the transport ring(s). Redundant core routers, in physically diverse locations, will provide the paths out of the local and middle mile network to the external IXP network. This diverse and redundant pathing of the transport to the interexchange points delivers a robust network that will ensure maximum uptime and minimal latency.

The middle mile / backhaul architecture leverages existing networks, using primarily a Layer 2 architecture. All transport is fiber-based. In the access aggregation portion of the network, individual 10 to 100 Gbps links are aggregated using 802.1ax Link Aggregation and G.8032 Ethernet Ring Protection Switching (ERPS) to interconnect the RTs and connect them to the core network. 100G transport links connect the access rings to the LecNet headend in Jackson, MS. A centralized network operations center (NOC) is located in Jackson, MS and operated by a TEC subsidiary, LecNet. TEC has 100 GB redundant transport routes from the company to the NOC. TEC's Internet peering connections and routers are monitored by the NOC personnel and two upstream providers, Cogent and AT&T, to ensure redundancy and adequate bandwidth and IP addresses are available to our broadband customers. TEC also peers at 350 East Cermak (Chicago) and 56 Marietta (Atlanta) via multiple CSpire 10 Gbps transit links. Additionally, TEC hosts Netflix and Akimai catching servers at the NOC in order to minimize streaming congestion on the network. In total, TEC has 50 Gbps of internet transport and transit bandwidth, with the ability to scale it higher as bandwidth usage grows. This network facilitates excellent response times across the network with minimal latency.

Detailed description of the proposed project: The strategy for this expansion project is to leverage existing fiber and continue building a network using a fiber to the home architecture utilizing passive optical networking (PON) technology and topology. The fiber plant will be designed to provide a fiber for every location passed and engineered for a 32:1 split ratio with ample spare fiber for growth in the area. The network equipment deployed will be the ADTRAN TA5000 with dual-function GPON/XGS-PON line cards, which will allow cost-effective deployment of GPON (2.5G) today while allowing a seamless overlay of XGS-PON (10G) as needed in the future.

BST intends to provide Gigabit performance services utilizing GPON and XGS-PON technologies over fiber at the end of the project construction in 2022. GPON (ITU-T standard G.984) is capable of subscriber speeds of 1Gbps symmetrical, while XGS-PON (ITU-T Recommendation G.9807.1) is capable of subscriber speeds of 10 Gbps symmetrical.

The build out timeline and turn up of customers is a one-year period for this project. This proposed design will deploy single mode fiber optic cables constructed utilizing RUS approved construction techniques. The Smith County Community Broadband Project is projected to be 75% aerial and 25% underground fiber construction. Aerial fiber construction will utilize existing poles under a current pole attachment agreement with the local electric cooperative in the proposed service area.

Buried or bored fiber will be placed in existing previously disturbed public rights-of-ways. To provide a more secure reliable fiber footprint all the buried fiber will be placed at a minimum depth of 36 inches unless other depths are required by the affected highway, railroad, municipalities, or other authorities. The two methods of underground construction that will be utilized are predominately plowing with a 1.25" pipe for fiber and directional boring utilized when road or stream or other types of crossings are required. Directional boring will also be utilized when it is not possible to plow or boring is more feasible construction. Along the buried fiber route, flush-mounted handholes will be deployed with the proposed fiber being accessible at each location. This will allow for easy access to the network and makes future expansions more economical and feasible.

Vendors must provide quotes on the entire quantity per material line item, must note expected delivery date, note if material is American made and if vendor is woman or minority owned (manufacturers noted are preferred, but other quality manufacturers will be considered):

Request for Proposal for Fiber Construction Materials						
Project	**Manufacturer**	**Vendor Part No.**	**Requirements**	**FriendlyName**	**Quantity Ordered**	**Comments**
Smith County NTIA	Corning	SCA-9T34-086CP	American Made	Splice Case - Corning SCA-9T34 - 8 Port	605	Must be delivered by 1/31/2023
Smith County NTIA	CommScope	FOSC450-B6-6-NT-0-B3V	American Made	Splice Case - CommScope - FOSC 450 B Case	30	Must be delivered by 1/31/2023
Smith County NTIA	CommScope	FOSC450-D6-6-NT-0-D3V	American Made	Splice Case - CommScope - FOSC 450 D Case	45	Must be delivered by 1/31/2023
Smith County NTIA	PLP	COYTD919R8-000	American Made	Splice Case - PLP - Coyote Dome 919B - 8 Port	100	Must be delivered by 1/31/2023
Smith County NTIA	PLP	COYTD928R8-000	American Made	Splice Case - PLP - Coyote Dome 928B - 8 Port	75	Must be delivered by 1/31/2023
Smith County NTIA	FONCS	FOSPC-012-F-MF8SJD4-FT000-EX	American Made	Reel - 12 - Loose Tube	200,000	Must be delivered by 1/31/2023
Smith County NTIA	Corning	048EC5-14100D20	American Made	Reel - 48 - Ribbon	270,000	Must be delivered by 1/31/2023
Smith County NTIA	Corning	096EC5-14100D20	American Made	Reel - 96 - Ribbon	180,000	Must be delivered by 1/31/2023
Smith County NTIA	Corning	144EC5-14100D20	American Made	Reel - 144 - Ribbon	200,000	Must be delivered by 1/31/2023
Smith County NTIA	Corning	288EV5-14100D53	American Made	Reel - 288 - Ribbon	20,000	Must be delivered by 1/31/2023