Gila Local Exchange Carrier, Inc. Rural Project Narrative

Section 1: Project Description and Timeline

With the support of the Arizona Commerce Authority (ACA), Gila River Local Exchange Carrier, Inc., dba Alluvion Communications, will install high-speed broadband communication technology that will expand broadband access to the residents and businesses of the Towns of Winkelman, Superior, and Hayden, Arizona.

How the proposed project addresses the broadband needs of the area(s) that it serves

Alluvion Communication's proposed project will install fiber-optic infrastructure for high-speed broadband communications through the City limits of Winkelman, Superior, and Hayden, Arizona.

Number of community anchor institutions served

Alluvion Communications anticipates that this project will provide each anchor institution in Winkelman, Superior, and Hayden an opportunity to gain access to an improved quality of broadband service.

Number of households served

This project will expand high-speed broadband access to at least 1,520 households in Winkelman, Superior, and Hayden, Arizona.

Number of businesses served

The proposed broadband expansion project by Alluvion Communications will provide each of the approximately 300 businesses in Winkelman, Superior, and Hayden, Arizona to access higher speeds of the internet than the current service.

Total population served

This project seeks to serve the entire population of Winkelman, Superior, and Hayden, Arizona, which is 4,444 as of 2020. In addition, the project proposed will provide backbone fiber from Winkelman to Globe, Arizona.

The anticipated economic development benefit achieved by construction of such improvements

With the support of the Arizona Commerce Authority, Alluvion Communications will empower the region to capitalize on its federal Opportunity Zone designation by providing high-speed broadband access, spur business attraction, ensuring business retention, and providing local innovation and business centers an opportunity to compete in a modern broadband dependent economy.

Total miles of fiber to be installed (if applicable)

Communications will install 50.89 miles of fiber.

Location of new fiber (aerial, underground or both?)

Both aerial and underground fiber will be utilized. Alluvion proposes entering into lease agreements with local utility owners to attach fiber to their respective poles. This will increase Alluvion's reach in each respective town as the proposed build will be more economical. At locations where poles are not present or it is not feasible to attach fiber to existing poles, Alluvion will evaluate installing new 40-foot wooden poles to attach the fiber. Finally, if installing new poles is not feasible, Alluvion will install the fiber underground in the conduit.

Stated commitment to operate and maintain the network for a minimum of five (5) years upon completion of the improvements

Alluvion Communications is committed to operating and maintaining the network for a minimum of five (5) years upon completion of the improvements.

The party or parties that will perform the infrastructure construction (if known)

Alluvion proposes to use its preferred engineering consultants and contractors, including Y.S. Mantri and Associates and Native Technology Solutions (NTS).

The intended uses of the ABDG Rural/Urban funds in respect to the construction or planning

With the support of the Arizona Commerce Authority, Alluvion Communications will utilize the funds to fully commit to building high-speed fiber-optic infrastructure throughout the Towns of Winkelman, Superior, and Hayden, Arizona and provide an opportunity for its residents and businesses to obtain a minimum of 100/100 Mbps speeds or greater. The funds will be used for the engineering design and construction phases. All other ineligible expenses such as networking, permitting, and maintenance will be funded by Alluvion's annual capital funds.

A timeline for completion of the infrastructure improvements

Alluvion Communications anticipates that the completion of infrastructure improvements will take approximately two years or less. Alluvion understands that the engineering and encroachment permits have multiple timetables and proposes to initiate critical tasks early on to reduce schedule delays. Items such as permitting approval from the Bureau of Land Management (BLM) and US Forrest Services can take 15+ months to secure. Thus, initiating said applications at the onset of the project will allow for the approval processes to take place while the rest of the engineering, permitting, and construction activities proceed. The team proposes to keep the Arizona Commerce Authority updated throughout the project duration and will notify them of any delay by permitting entities. Constant communication and attention to detail is our plan to maintain the project schedule and avoid delays outside Alluvions control. A proposed project schedule has been prepared and attached to the application.

The timing of match

Alluvion Communications is committed to providing match and financial resources at notice of award.

The intended uses of the match

Alluvion Communications intends to leverage its [redacted] match to cover 1) Permitting/Encroachment Fees, 2) Network Engineering, 3) Construction Management and Administration, and 4) Eligible costs as needed.

The identity of any sources other than the applicant who are responsible for such match or portions thereof

Alluvion Communications is responsible for the match committed to the Arizona Commerce Authority Broadband Development Grant.

The nature of the commitment by the Applicant or other parties to deliver the match including whether such commitment is in writing and binding in all circumstances

Alluvion Communications has amended a board resolution to this application signifying a binding commitment to the [redacted].

Importance of ABDG Urban Funding

In the absence of ABDG funding, Alluvion Communications would not have the financial capacity to provide service to the residents of Winkelman, Hayden and Superior, Arizona. However, with the support of the Arizona Commerce Authority, Alluvion Communications will have the opportunity to provide broadband access to a community that does not currently have adequate access.

2. Project Description and Timeline – Development

The project proposes to install high-speed fiber-optic infrastructure throughout the Town's of Winkelman, Superior, and Hayden to provide access for residents and business to obtain 100/100 Mbps or greater internet speeds. As such the project will be designed and constructed in various phases based on the following fiber layers:

Layer 1 Backbone Fiber

Layer 1 is the fiber optic backbone proposed along arterial roadways from the nearest communication node. For this project, fiber is proposed to originate from Winkelman along SR177 towards Superior. The backbone will pass Hayden and will ultimately terminate in Globe, provide opportunity for a future expansion in Globe. Multiple communication nodes are proposed as part of this layer so that fiber can terminate into communication end equipment. To provide sufficient capacity along the backbone, Alluvion will install one 288 strand single mode fiber optic cable. The cable will be installed on existing overhead utility poles with the opportunity to install a second 288 strand cable in the future. Where there are no poles, Alluvion will install either new poles to hang the fiber or will install three 1.25 inch underground conduits along the route. This will provide more than enough capacity for future growth along the route, or availability to lease fiber to other carriers. Once the in the various Town limits, the layer 1 fiber is installed along the major roads with vaults placed at incremental locations.

Layer 2 Branch Fiber

Layer 2 communications is the connection from the backbone fiber to the local communities via fiber or wireless medium. When fiber is installed, layer 2 fiber is typically a smaller count cable such as 96-strand or a 48-strand cable. At neighborhood entrance points, there are smaller handholes that house splice enclosures or layer 2 splitters for fiber to convert to 1:32. Existing utility poles will be utilized to install the fiber where available.

Layer 3: Branch Fiber

Layer 3 fiber is installed along the local roads adjacent to the houses from the layer 2 handholes. These are smaller count cables as well, 12 or 24 strand count and use to populate the local roads as residents start requesting service. The cables connect to splitters which further split the connection to 1:32 or 1:16 depending on the distance. Existing utility poles will be utilized to install the fiber where available. If utilities poles are not available, there are other means of installation such as micro trenching to help reduce costs. This will require approval from the agencies as micro trenching typically installs the fiber at roughly 12 inches below ground. Thus, any pavement replacement in the future may necessitate the relocation of such fiber if impacted.

Layer 4: End Connection Fiber

Layer 4 is the end connection from the streets to the houses upon service request.

Type of technology to be utilized

- Cable: Single Mode Fiber Optic Cable (288, 144, 96, 48, 12 counts)
- Junction Box: 2.5 ft x 4 ft x 3 ft deep, Tier 22 rated
- Up to 1:32 Splitters
- GPON Layer 3 switch capable of providing up to 10 Gig Communication Speeds

Type of construction to be undertaken (aerial or underground)

- The fiber for Layer 1 installation will be installed underground.
- Underground conduit configuration will consist of three 1¼ inch ducts. The conduit material will be High-Density Polyethene (HDPE) with a Standard Diameter Ratio (SDR) of 11 for high-strength directional drilling applications.
- Underground conduit for layers 2, 3, and 4 will be smaller size conduit, i.e., 1 inch or 2 inches in size to reduce the impact on the surrounding area.
- In the non-populated segments, the underground conduit will be either trenched or directionally drilled based on if the conduit is installed below irrigation or other underground utilities. The goal is to avoid utility relocation. This will be based on environmental and utility constraints.

- Underground conduit in the populated areas will be installed by directionally drilling to reduce impact to landscape, pavement, sidewalk, and other roadway elements.

At locations where there are existing utility poles in the alleyways, layer 3 and layer 4 fiber will be installed on overhead poles.

Qualifications of the vendors/contractors

For engineering design, Y.S. Mantri and Associates, LLC (YSMA) will support Alluvion by preparing engineering plans, coordinating permit approvals, and facilitate lease agreements and encroachment permits. YSMA has planned, designed, and managed over 200 miles of fiber optic infrastructure throughout the State of Arizona for various governments including ADOT, MCDOT, Town of Gilbert, City of Chandler, and others. In the telecommunications industry, YSMA has been exclusively working with Alluvion since 2016 and has helped implement over 100 miles of fiber, with another 200 miles planned for installation in the next 3-5 years. YSMA is a reputable engineering firm in Arizona and has developed concepts of operations and fiber implementation plans generating 10-year horizon builds for said agencies. The firm is equipped with fiber splicing and testing equipment, allowing YSMA to perform spot inspections during construction ensuring that the proposed workmanship satisfies the project need.

Native Technology Solutions (NTS) will oversee construction activities. NTS is a Gila River Indian Community-owned and operated business that provided services such as structured cabling, access control systems, security systems, and fiber-optic networks to customers on and off the Gila River Indian Community. NTS customers range across many industries including education, healthcare, and government sectors. NTS has traditionally been recognized as one of the top low voltage cabling contractors and design firms serving the Arizona area. NTS's structured cabling installation team focuses on the specific requirements of each customer and offers turnkey solutions that fit the needs of individual customers.

Engineering analysis

On behalf of Alluvion Communications, YSMA has prepared a preliminary engineering analysis on the distance the cable can be attached to the poles. The following criteria highlight the major components of the build:

- An average span distance of 700 feet between poles was used.
- The load calculations were developed using a 288 Strand cable, 3/8-inch galvanized steel strand, a wind coefficient of friction on the cable as 1.2, a standard 2.5% cable SAG, and grade 5 bolt connected to the attachment hardware.
- Based on the factors above, the percent tensile load of the strand breaking strength was calculated to be 29% of its minimum breaking strength.
- However, at such a span distance, they sag in feet is roughly 17.5 feet. This is not feasible since the fiber will most likely be attached 20-25 feet on the pole.
- With the tighter pull of the strand, i.e., SAG of 1.5%, the tension strength of the strand will be roughly 48% of the minimum breaking strength. This would yield a SAG of 10.5 feet.

This is more feasible; however, to keep the fiber at a higher height above the ground, Alluvion prefers a minimum vertical height above the grade of at least 16-18 feet. This will require mid-block utility poles or a smaller SAG percentage.

- We evaluated the stress on the hardware, specifically the attachment bolt with 700 feet spans.

- Using a grade 5 bolt, the stress on the bolt of the bolt would be roughly 32% of the allowable stress. This assumes that the bolt is roughly 0.75 inches extended from the pole. However, the preference is that the bolt is flush up against the pole during construction.

Project approach
Alluvion Communications project approach is as follows:

Phase 1: Due Diligence
We will obtain an Arizona Blue Stake Ticket (AZ811) in order to identify utilities and irrigation facilities present in the area. This will allow us to begin negotiations for entering into lease agreements with utility owners and begin the approval process to cross under/over-irrigation facilities. It has been our experience that approval to cross irrigation facilities can take upwards of 6-8 months. We will do research on the Arizona State Land register to identify what agencies and other entities may be present that have jurisdiction rights along the route. A comprehensive understanding of the landowners will give our team a leg up and obtain requirements early on for obtaining permits. We will research land deeds, title reports, and record drawings to depict and accurate right of way of the project. During this phase, we will perform a site investigation to identify visible constructability issues that can potentially impact the proposed alignment.

Phase 2: Prepare Project Work Plan and Concept Plans
We will prepare a project work plan highlighting the potential issue, conflicts, agency contacts, permitting requirements, and work schedule to give the team an overarching view of the project and set the expectations of what is required to obtain engineering approval. We will prepare concept plans with sufficient detail to begin the licensing process. Some entities in Arizona can take upwards of 1-2 years to secure agreements and permits to construct. Thus, our goal is to isolate those entities and begin engineering the project at those locations first.

Phase 3: Prepare Engineering Plans and Specifications
We will prepare and complete a draft set of engineering construction documents that will include the following items:

- Utility base mapping of available utility information
- Right of way base mapping
- Section control information
- Engineering design of preferred fiber and junction box locations.

- We will perform a plan-in-hand review of the plans to ensure all items are captured and reflected in the plans.
- The plans will also include optional locations of the communication nodes to tie in the backbone fiber
- Conduct final engineering load calculations

Upon completion of the draft set, we will work with the contractor to solicit constructability reviews to ensure items can be feasibly constructed. Comments from the contractor will be incorporated in the plans, and a final signed plan will be submitted to the appropriate agencies for a review period and permitting.

Phase 4: Marketing Team Solicits Residents and Layer 2, 3, and 4 Designs Proceed

Once the backbone plans are in the review and permitting stage, the marketing team will begin soliciting residents to identify who will be requesting high-speed fiber. Thus, we will begin designing plans of the layer 2, 3, and 4 plans as necessary to provide service to residents requesting communications. This will happen concurrently to reduce the overall schedule of the project.

Phase 5: Construction Phase

Once construction is underway, our team will perform the following items:

- Biweekly inspections of work-in-progress. This includes checking construction accuracy with what is reflected on the plans.
- Weekly construction status meetings to go over project schedule, work completed, and work-in-progress activities.
- Perform a plan-in-hand walkthrough to develop a punch-list of items for implementation.
- Complete the final construction activities and set up project closure walkthrough with the permitting entities.
- Perform splicing, testing, and review of splicing results. Resplice areas that fail to meet optimal decibel loss.
- Project Complete.

Population to be served

With the support of the Arizona Commerce Authority, Alluvion Communications will serve the entire population of Winkelman, Superior, and Hayden Arizona.

Number of households served

Alluvion Communications will serve up to 2,000 households.

Type	Project	Applicant	GEOID
Rural	Winkelman, Hayden, and Superior	Gila Local Exchange Carrier dba Alluvion	04007001300
Rural	Winkelman, Hayden, and Superior	Gila Local Exchange Carrier dba Alluvion	04021000400