Section A. Arizona Broadband Development Grant Narrative

January 31, 2022

Executive Summary

The anyCOMM proposal for an Arizona Broadband Development Grant:

- Targets last mile connections citywide and into surrounding rural areas.
- Creates a collaborative long-term public-private-partnership with local government.
- Reliably meets or exceeds symmetrical download and upload speeds of 100 Mbps.
    - Utilizes Wi-Fi 6E.
    - Provides Gigabit speed capability.
- Showcases anyCOMM's unique ability to significantly lower the cost of wide-coverage, meshed, high-speed scalable Broadband Service and Infrastructure in a wireless/fiber model, in both city and rural landscapes.
- Includes community feedback to develop an affordability plan that includes a low-cost option that allows multiple users to telework and/or learn remotely.
    - [redacted] for 100Mbs download and 25Mbs upload
    - [redacted] for 200Mbs download and 100Mbs upload
    - [redacted] for 300Mbs download and 100Mbs upload
- Allows participation in current and future federal programs that subsidize broadband internet service for low-income households, including the FCC's Emergency Broadband Benefit (EBB) program.
- Significantly enhances educational, healthcare and economic development opportunities and competitiveness in the region
- Supports FirstNet, first responders (Federal, State, Local, Tribal) radio spectrum

The City of Yuma and surrounding rural areas are not currently served by a wireline connection that reliably delivers at least 100 Mbps of download speed and 20 Mbps of upload speed. The anyCOMM meshed Wi-Fi network will provide high-speed Broadband access to all – unserved and underserved, all businesses and educational, healthcare and government anchor institutions – an entire population of over 90,000.

Engineering and network mapping are done, and a contract is in place between the City of Yuma and anyCOMM. We have worked with community to develop an affordability plan that includes a low-cost high-bandwidth option that allows multiple users to telework and/or learn remotely. Additionally, anyCOMM has right-of-way language in place in the contract with the City of Yuma which will enable a project to move forward quickly.

Upon completion of the project, Yuma will become the best-connected City in Arizona, with very reliable, high-broadband capacity and world class connectivity speeds.

1.PROJECT DESCRIPTION AND TIMELINE

Nature of the Improvements

anyCOMM deploys a revolutionary "last mile" Wi-Fi broadband solution for communities, cities, towns and farms. The anyCOMM project will build the Wi-Fi infrastructure backbone at the intersection middle-mile fiber (existing city/private) and last-mile gateways. At the core of the anyCOMM solution is a next generation Wi-Fi 6E router (Node), which can be installed on top of city streetlights, utility poles and other nearby rural assets, creating a mesh network that provides up to 2.5 Gb of broadband connectivity and up to 10 Gbps of throughput (10x the speed of the fastest wireless technology in use today). The infrastructure will readily support download/upload speeds of 100Mbps/100Mbps across the covered area. By deploying the anyCOMM Wi-Fi broadband infrastructure, a new high-speed, wireless networking platform is created that can evolve without the need to constantly change hardware, and is easily scaled 1) for capacity within the covered area and 2) geographically to outlying areas.

Notably, a key differentiator of the anyCOMM solution is that the network is fully meshed across the entire city (Wi-Fi is everywhere). A subscriber can be online anywhere throughout the network, not just their home or business.

How the Project Addresses the Broadband Needs of the Area Served

The most critical part of access in the Yuma region is the last-mile. Of the two primary Internet providers in the area, the first, within their footprint, is generally able to deliver at speeds of 25 Mbs down and 3Mbs up, meeting the definition of high-speed connections as outlined by the FCC. This is not sufficient. The second is able to provide limited fiber connections, which within their footprint provides higher speed broadband, but this is mainly concentrated on business class activity. In this case, the best reported broadband speeds are about 100Mbs down and 15Mbs up, but is not available everywhere and not affordable for many households or smaller businesses. Their DSL product offered elsewhere is very limited, and available on an aged copper infrastructure that is failing and is extremely limited; in areas they can still service, bandwidth is substandard. In many areas the company is no longer accepting new customers and is not upgrading their last mile service.

Deployment of the anyCOMM high-speed network readily meets the requirements for providing stimulus enhanced broadband to everyone in the covered 23 Census Tracts, , including the disadvantaged. 15% of this population is on low-income housing assistance. For the 23 Census Tracts to be served, census data provided from the NTIA maps (www.broadbandusa.com) revealed:

- 19% of households have no internet connection.
- 21% of the population has income in the last 12 months below the poverty level.
- Download speeds range from 64-114Mbs, upload 11-12Mbs.

In stark contrast to the rest of Arizona and national figures, unemployment in the Yuma area is high. In Yuma County, AZ (November 2021) Unemployment Rate was **14.80%**. The Arizona Unemployment Rate (November 2021) was **4.70%**. Part of the anyCOMM proposal is to provide 1500 free home gateways, covering 27% of the households.

A major benefit of providing the anyCOMM meshed high-speed Wi-Fi to the peripheral farming communities is the opportunity for all vehicles and equipment to be connected wherever they are on the farm. As one of the largest agricultural bases in North America, providing 80% of the domestically grown winter fruits and vegetables and hundreds of millions of dollars to the local economy, real-time internet connectivity is vital for local farming businesses to remain competitive. The network can be readily expanded to outlying farms.

Lastly, because Yuma sits on top of a massive fiber trunk crossing the nation, a world best-in-class high-speed Wi-Fi network above ground will significantly enhance the City's and region's capacity and competitiveness for economic growth.

Anticipated Economic Development Benefit Achieved by Construction of Such Improvement

Today the US has fallen behind other industrialized countries in both the speed and capacity of internet connectivity. This directly impacts American competitiveness and economic development, especially in rural areas.

The anyCOMM high-speed Wi-Fi network will empower Yuma government, small, large and new businesses via wireless devices to transact, send and receive real-time data from anywhere in the covered area. This key differentiator unlocks massive economic potential. Envision Yuma as a living lab environment for the next generation of gigabit applications. For example, the Node contains a V2X (vehicle to infrastructure) chip, as does nearly every new car, positioning Yuma as the only City in the U.S. where the automotive industry, App designers and others will be able to take advantage of this technology at scale. High speed Wi-Fi connectivity will create numerous opportunities in the connected world, for public safety, traffic and energy management; real-time telemedicine, and government and utility asset monitoring and maintenance. Below, in Section 3 – Other Project Options, additional features and capabilities of the Node are detailed that create significant other economic development opportunities.

Additionally, anyCOMM has agreed to open the anyCOMM Southwest Quadrant Network Operating Center (NOC) in Yuma upon award of an Arizona Business Development Grant for this proposal. This is a [redacted] investment by anyCOMM. Over the next 5 year period, the NOC will grow to employ 300 software and hardware engineers, technicians, project managers and administrators, with annual salaries ranging from [redacted].

Location of new Infrastructure (Nodes)

The Nodes will be simply installed, replacing photocells on top of city streetlights, utility poles and other nearby rural assets to create a mesh network within a contiguous area of the City of Yuma and nearby rural areas. Please see Section H. Maps. The proposal utilizes existing fiber. Because of the simplicity to expand the network, additional areas within the city and surrounding rural and tribal areas can be added in future phases. anyCOMM will separately establish physical facilities in the City for backend servers, electronics, cabling, equipment and other hardware. About 150 of the Nodes will be reserved as strategic inventory. Over the two-year period of the project, locations will be identified and Nodes installed where additional capacity is needed or in City identified areas, for example new residential/commercial sections, farms, or economic development zones.

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

anyCOMM is committed to both maintain the network and provide world class service, capacity and speeds for 25 years, which is the term of the contract with the City of Yuma. This is paramount to the success of the business model.

Information Request under ***Section 1.4 Eligible Projects***

- anyCOMM will "*incorporate infrastructure supporting download/upload speeds of 100Mbps/100Mbps ("100/100") with the minimum acceptable download/upload speeds of 100/25Mbps ("100/25") for a period of at least five (5) years*";
- *Within 24 months of the award date*, anyCOMM will provide
    - *"broadband service to unserved or underserved areas by actively providing speeds of 100/100 to the intended beneficiaries of the project and"*
    - *"increase existing speeds to 100/100 to the intended beneficiaries of the project at costs that are lower or substantially equal to urban areas and/or;"*
    - *"provide middle-mile redundancy to the region."*
- anyCOMM is "*not a recipient or proposed as a subrecipient under any pending applications for federally funded grants or cooperative agreements*."
- anyCOMM is "*capable of executing a contract with the ACA within sixty (60) days of notification of a grant award.*"
- anyCOMM can "*demonstrate financial capacity to pay the incurred expenses of the project while grant reimbursements are being processed*." See Section E – Documentation of Commitments

A Timeline for Completion of the Infrastructure Improvements

anyCOMM will begin the project within 3 months of the signing of an Agreement. Timeline for completion is 24 months. See the timeline in the Appendix.

Amount of the Cash "Match" Contribution

Amount of the cash contribution – anyCOMM will provide a cash contribution of [redacted]. This is 11% of the project total.

The timing of such match – The cash match is available upon signing of an Agreement. Please see Section E – Documentation of Commitments.

The intended uses of the match – The cash match will be used to support costs to complete Grant Plan Application; primarily for the construction costs of building out the project and for permits. Please see Section D – Budget.

The identity of any sources other than the applicant who are responsible for such match or portions thereof anyCOMM will self-fund the project. Please see Section E –

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 – anyCOMM will self-fund the project. Please see Section E – Documentation of Commitments.

Why, in the absence of ABDG-Rural/Urban funding, the proposed project would not proceed within the same time frame or would not otherwise be as effective in advancing the objectives of the Program? anyCOMM and the City have researched and discussed funding alternatives with other parties, but none of those can commit to funding the project within the near term.

2.PROJECT DESCRIPTION AND TIMELINE - DEVELOPMENT

Type of Technology to be Utilized

anyCOMM deploys a revolutionary "last mile" Wi-Fi broadband solution for communities, cities, towns and farms. At the core of the anyCOMM solution is a next generation router (Node) that is placed on the photocell socket in cities, and poles on farms and in rural areas. By deploying these anyCOMM Gen 7 devices, a new high-speed, wireless networking platform is created.

This network can be connected to antenna/access point combos installed at any residence or business to bring high-speed Wi-Fi 6/6E. These next generation routers form a mesh which upstream is connected to fiber access points that flows the data through concentrators to a central Network Operating Center (NOC) and then to the internet. Please see Section I for Network Diagram.

Network Components

Gen 7 Node – *on every streetlight*

- Each Node can handle up to 25 concurrent subscribers *(homes, businesses, farms).*

- Every group of 25 Nodes has one terminated *(master node)* with a multiplexed 10GB dark fiber.
- In cases where there is no fiber, the master Node will be terminated with point-to-point Wi-Fi.
- Each Node has an active LTE radio for "fallback" Node health reporting/configuration to anyCOMM.

Gateway Extender – *for each household and business*

- This unit is mounted on the exterior of the premises and has an integrated directional antenna
- It is connected with a single PoE CAT6 to an inside Wi-Fi router
- Max range and speed to a meshed Node is up to 1.5 miles and 2Gbps *(must be line of sight)*

Master Node Concentrator Server

- Every master Node is terminated to one of these servers
- It aggregates and multiplexes dark fibers into main trunk lines
- The capacity of each server is 25 master Nodes

Backend VPN Server

- Every Node makes a VPN connection to a backend server
- Each server has a capacity of 500 nodes

Broadband Technology of the anyCOMM Node

The anyCOMM Wi-Fi 6E node promotes a wireless-first access approach. A list of features for Wi-Fi 6E Node:

- Wi-Fi 6 only radio module
- Slow legacy devices are on a separate radio (802.11a/b/g/n/ac)
- FirstNet radio spectrum also supported (FirstNet is a nationwide first responders network connecting Federal, State, Local and Tribal authorities)
- Scheduled: Can segment and implement policy for security an.d Quality of Experience (QoE)
- Optimized delay: Less than 2 milliseconds at scale, even in high-density environments
- High bandwidth: Wide channels are easily supported and encouraged (up to 2.4Gbps)
- Clean RF: Low noise, less congestion

From an independent Cisco whitepaper overview dated Jan 27, 2021 – "The Next Great Chapter in Wi-Fi"

> "Wi-Fi 6E didn't just happen overnight, and the solutions it brings have all been studied and largely targeted to solve specific challenges. Wi-Fi has made many advances that have contributed to its growing success over the years. Much as Wi-Fi 6 was created to solve some of the issues inherent with Wi-Fi 1 through 5 operations, Wi-Fi 6E will now implement spectrum rules that favor better Wi-Fi operations. This is the first new spectrum granted for Wi-Fi in the U.S. since the 802.11a (Wi-Fi 3) days. The Wi-Fi 6E specification was designed and implemented to remove the spectrum obstacles that have prevented users from taking advantage of some of the coolest features in Wi-Fi (such as 80 and 160 MHz channels)."

The front-end of the anyCOMM solution is an "open architecture", feature-rich communications "Node" running the anyCOMM Networking Communications Layer (ACNCL). It is a field-installable, direct replacement for the standard outdoor photocell that is typically installed on top of streetlights and, upon installation, immediately self-connects to the network, requiring no further work by the installer. No changes to a city's existing infrastructure are required to deploy the anyCOMM solution. On farms and other rural locations, a Node is simply installed on a pole or other structure. The Node is 100% self-contained, and it works on almost any fixture and through almost all power sources (90-305 VAC).

anyCOMM is the network operator for the Yuma Wi-Fi deployment. The underlying mesh network is a SON (self-organizing network) that is similar to a cellular network except it's Wi-Fi. It's a managed network - anyCOMM owns the IP (controls the routing tables) which is the basis that all the other topology (SDWAN, IPsec, etc.) rides on. In some scenarios we can be the ISP. In others, we can share the revenue and partner with other providers.

Type of construction to be undertaken

The anyCOMM solution is an "aerial type of construction", in which a Node is placed on the photocell socket of streetlights in cities, and likewise on streetlights and other poles on farms and in rural areas. The Nodes will be positioned to create a mesh network within a contiguous area of the City of Yuma and nearby rural areas. See Section H - Maps. The proposal utilizes existing fiber. Because of the simplicity in which the network can be expanded, additional areas within the city and surrounding rural areas can be added in future phases.

Qualifications of the vendors/contractors

Westmore Electric (1636 E. 20th St. Yuma AZ), a local licensed and bonded entity, will be the contractor for the installation. This is the same contractor that recently installed new LED streetlights in the City of Yuma. Using the streetlight contractor to install the anyCOMM Nodes is a logical step since he will provide a known service – the Node simply replaces the photocell

(that they originally installed), which is standard on all streetlights and typically fitted by the same contractor.

WANRack (Kansas City, MO) builds Private Fiber Wide Area Networks (WANs). The company is renowned nationally for their work providing WANs for K-12 educational facilities. The company is licensed and bonded, and has installed miles of fiber in the City of Yuma already. WANRack will be providing dark fiber termination to the Nodes from existing street fiber.

Engineering analysis

Prior to the signing of the contract, the City of Yuma in collaboration with anyCOMM performed a thorough engineering analysis to create this proposal. Subsequentially, a series of maps and network diagrams were created detailing the exact locations of existing fiber in the area, and location of the to-be-installed anyCOMM hardware. Please see Section H - Maps.

Project Approach and Background of the Project

anyCOMM Holdings Corp is a Delaware C Corp that was founded in 2013 with primary offices located in Gold River, CA. Because a contract has been signed between the City of Yuma and anyCOMM, the proposed project approach going forward is clear. The technology and software are well developed; the hardware is field tested for years, and manufacturing is in place. Upon the signing of an Agreement, anyCOMM will proceed as detailed on the timeline, placed in the Appendix.

The primary use of the ABDG project funds will be for hardware purchases, primarily

- Gen 7 Node – on every streetlight/pole in the covered area
- Gateway Extender – 1500 for unserved and underserved households
- Master Node Concentrator Servers
- Backend VPN Servers and other Hardware
- Dark Fiber Terminations (labor and material)

The City of Yuma and anyCOMM worked through and signed a contract to build the high-speed Wi-Fi broadband infrastructure proposed in this Grant Plan Application. The technology and implementation plan are as described above. The contract is available for review. The key elements of the City of Yuma – anyCOMM contract are listed below.

anyCOMM and the City of Yuma have created a public-private partnership model. The general terms of the partnership are:

- The City of Yuma licenses the streetlight photocell sockets to anyCOMM for 25 years
- anyCOMM provides Nodes and all other Hardware
- anyCOMM dedicates 5% of the bandwidth of network back to the city for their use
- anyCOMM shares net profits with the City.

- anyCOMM provides an IoT networking platform for others
    - sells network capacity (to broadband, cable, cellular & fiber customers)
    - sells analytics from the Nodes on a cost per megabyte to others
- anyCOMM maintains the Network and Nodes for the term of the contract (25 years)

Entities Served

- Number of Census Tracts served: 23 (see Section H for list)
- Population to be served: 89, 951 (NTIA maps – www.broadbandusa.com)
- Number of households served: 29,494 (NTIA maps – www.broadbandusa.com)
- Number of anchor institutions served: 198 (estimate: Education, Government, Health, (10) Employers >100, Malls, etc.)
- Number of businesses served: 2595 (SOURCE: 2018 County Business Patterns – "

3.OTHER PROJECT OUTCOMES

In Section C.1., we have extensively discussed how the project will support and enhance the general public, local businesses, future economic development, and educational and healthcare advancements. Other project outcomes include:

Enhanced Community Resiliency: The nature of the anyCOMM mesh network provides an order of magnitude more resiliency for Internet connectivity. Since the Nodes are mounted on streetlights, typically spaced 150' apart, and have a maximum range of 2500', there will be multiple Node connections available for any residence, business and roaming wireless device. Effectively, each Node is a high-speed broadband "hot spot", situated densely among others to create a very resilient network.

Other Revenue Generating Opportunities: anyCOMM will share 15% of the net profit with the City of Yuma. An additional source of revenue is Wi-Fi based cellular off-loading. With ever increasing capacity demands on cell carriers, an opportunity exists to use the anyCOMM high-capacity, high-speed Wi-Fi network to offload cellular calls.

Wi-Fi based cellular offload

- Each node can handle nearby phone calls otherwise dropped by cell towers
- Deployed on every streetlight they form a local grid to provide excellent coverage

Additional Capabilities: The Node replaces the photocell on the streetlight to create the anyCOMM meshed high-speed Wi-Fi network. Included within each Node is a Next Generation Lighting Controller, available to the City; and a Utility Smart Meter, available to the City and local utility for monitoring power consumption of dimmed/controlled streetlights. Key features are:

Next Generation Lighting Control

- Each Node has the capability to monitor and control all aspects of the streetlight
- This includes reporting power consumption to the City and utility company
- The system monitors streetlight outages, health of the power supply and can make adjustments

Utility Company Smart Meter

- Located inside each Node, on each streetlight – *can be used for actual billing of power consumption*
- Each node can also act as a sub-meter and can monitor other equipment - *such as EV charging stations, parking meters or even holiday lights*

Optional Features: Available to the City, who will maintain 100% control, are several optional ***Public Safety*** features. These are fee-based options, that the City can activate on none, some or all of the Nodes.

Public safety emergency video monitoring

- Each node has 4 HD video cameras that can be enabled just for an emergency or full time
- When enabled, they record internally for 30 days *(just like an ATM cash machine)*
- If there is an event, the city has access to data *(video & audio)* from each device

Emergency alerts

- Each node has 12 high-intensity full color notification LEDs
- In an emergency they can flash different colors to let the public know emergency paths to follow
- They can be tied to city resources such as earthquake or hurricane routes

Audio messaging

- Each node has an HD audio output – *to drive externally mounted speakers*
- It can stream audio from any remote location
- This could be used for emergency services *(ex: police public address)*
- It could also generate revenue by streaming commercial services to downtown areas

Additional Optional Capabilities for future development:

Sensors on-board the node can be enabled to provide additional capabilities

- In-vehicle potential collision alerts *(V2X)*
- Vehicle, pedestrian counting & traffic control
- Earthquake sensing
- Copper theft detection
- Gunshot & Graffiti detection

Census Tract Data for Application

From NTIA Maps (www.broadbandusa.com)

23 Census Tracts Served

Census Tract Number	Population	# Households	Households w/o Internet Connection (%)	Poverty Rate (%)	# Households w/o Internet Connection	# Households in Poverty (last 12 mos)
4027000301	3621	962	25	21	241	202
4027000404	4102	327	36	36	118	118
4027000402	3515	1010	22	23	222	232
4027000502	3179	1267	8	9	101	114
4027000403	1549	508	30	28	152	142
4027000302	4647	1631	38	50	620	816
4027000600	5384	1881	24	21	451	395
4027000200	3701	1187	32	30	380	356
4027000100	2951	698	30	45	209	314
4027000700	4356	1468	39	36	573	528
4027000800	5403	1941	10	20	194	388
4027000901	2815	1205	20	18	241	217
4027000902	3024	1103	16	17	176	188
4027000905	8429	2483	7	18	174	447
4027000501	2990	1306	9	8	118	104
4027000903	3346	1132	5	3	57	34
4027000908	3389	1139	2	5	23	57
4027000907	6828	2169	8	14	174	304
4027001004	2572	943	30	40	283	377
4027001003	1259	415	35	20	145	83
4027001100	5433	2112	21	16	444	338
4027001200	4419	1413	11	8	155	113
4027001001	3039	1194	19	17	227	203
TOTALS	**89,951**	**29,494**			**5,477**	**6,070**

% Households with no Internet connection	19%	
% Households in poverty	21%	
Range Median Download Speeds (Mbs)	64-114	
Range Median Upload Speeds (Mbs)	11-12	
%: Free Gateway/No Internet Connection	27%	1500/5477