FY2022 ARIZONA BRAODBAND DEVELOPMENT GRANT (ABDG-22) – RURAL

APPLICANT: NTUA WIRELESS, LLC
PROJECT NAME: NAVAJO NATION FIBER-TO-THE-HOME

Project Narrative

Applicant

NTUA Wireless, LLC (NTUAW) was created in 2011 to bring voice and broadband services to the residents of, and visitors to, the Navajo Nation. NTUAW is majority-owned by the Navajo Tribal Utility Authority a Navajo government entity. The Navajo Tribal Utility Authority has been operating on the Navajo Nation since 1959 and is the largest multi-utility enterprise owned and operated by an American Indian tribe. NTUAW is managed by Commnet Wireless, LLC ("Commnet"). Commnet serves unserved and underserved rural communities in the southwestern states of the United States.

NTUAW provides both fixed and mobile broadband service on the Navajo Nation. NTUAW has successfully secured Connect America Funds to deploy broadband service to previously unserved households on the Navajo Nation. Additionally, NTUAW has been designated an Eligible Telecommunications Carrier ("ETC") by the Federal Communications Commission. As an ETC, NTUAW is able to offer discounted voice, broadband or bundled service to residents of the Navajo Nation who qualify for support under the Federal Lifeline program. NTUAW has also been providing broadband discounts under the FCC Emergency Broadband Benefit Program and is participating in the FCC's new Affordable Connectivity Program. The ability to provide discounted service has been instrumental in growing NTUAW subscribership on the Navajo Nation in light of the high poverty levels that are prevalent on the Navajo Nation. NTUAW currently provides service to over 20,000 customers on the Navajo Nation.

Project Location

1. The project location consists of five tribal communities on the Navajo Nation. Specifically, the proposed service area includes the Rough Rock Navajo Housing Authority, the Tuba City Navajo Housing Authority, the community of Steamboat, AZ, the Cornfields Navajo Housing Authority and Bird Springs Navajo Housing Authority.
2. These five tribal communities are located in Apache, Navajo and Coconino Counties. Apache and Navajo counties are two of the poorest counties in the State of Arizona.

	Per Capita Income	County Per Capita Income as a % of Arizona	County Per Capita Income as a % of United States
United States	$27,334	106.44%	
Arizona	$25,680		93.95%
Coconino County	$22,632	88.13%	82.80%
Navajo County	$16,745	65.21%	61.26%
Apache County	$12,294	47.87%	44.98%

3. According to NTIA's Broadband Availability Map, Ookla speed test data shows the average median download speed in the census tracts where these communities are located is 6.59 Mbps and average median upload speed in the census tracts where these communities are located is 1.87 Mbps. The table below shows the median upload and download for each of the census tracts where the communities are located.

4. NTIA data also shows that, on average, 76.6% of households in the census tracts where these communities are located lack internet service.
5. According to NTIA's Broadband Availability Map, the average Percent of Population whose income in the past 12 months is below poverty level, where these communities are located is 40.92%.

Maps of each of the five tribal communities that will be served is attached to this filing (see Maps Folder).

General Nature of Proposed Improvements (See below for Technical Descirption)

1. The project proposes to deploy fiber-to-the home-networks (FTTH) in each of the proposed service areas.
2. Given that the proposed project is an all fiber design, NTUAW proposes to initially offer service plans starting at symmetrical 50 Mbps up to symmetrical 1 Gbps that can be scaled up to 10 Gbps in the future. Because the proposed project is an all fiber design, provisioning services at the grant speeds of 100 Mbps/100Mcps to all locations identified in the Application is easily achievable.
3. The proposed project will deploy aerial and underground last mile fiber connections leveraging NTUAW's parent company, the Navajo Tribal Utility Authority's electric poles and conduit.
4. NTUAW's ability to utilize existing infrastructure to place its fiber will significantly reduce make ready costs and expedite the tribal rights of way/permitting time frames.
5. Furthermore, the project proposes to leverage Navajo Tribal Utility Authority's all fiber middle mile network to connect the proposed last mile network to the Internet. NTUAW's ability to connect the proposed last mile network to an existing middle mile network not only reduces the overall cost of deployment but the deployment timeframes given the distance and geographic isolation of these proposed communities. Therefore, NTUA Wireless is confident it will complete the proposed project within 24 months as required.

How the Proposed Project addresses the Broadband needs of the Proposed Service Area

	Rough Rock	Tuba City	Steamboat	Cornfields	Bird Springs	Average
Census Tract	4001944300	4005945000	4001944902	4001944902	4017940015	NA
County Name	Apache County	Coconino County	Apache County	Apache County	Navajo County	NA
Population (FCC 2019 Estimate):	7,083	5,559	5,175	5,175	4,675	5,533
Percentage Households without Internet Access:	86.40%	83.60%	75.40%	75.40%	62.50%	76.66%
Percentage Households without Computer, Smartphone or Tablet:	68.80%	41.70%	56.20%	56.20%	36.30%	51.84%
Ookla Speedtest Median (Mbps):	6.89/1.87	4.98/1.77	7.38/1.90	7.38/1.90	6.33/1.93	6.59/1.87
Percent of Population whose income in the past 12 months is below poverty level (%)	44.10%	33.00%	44.90%	44.90%	37.70%	40.92%

1. According to NTIA Ookla Speed test data (set forth in table below), the average Median upload and down load speeds in the proposed service area is 6.59 Mbps upload and 1.87 Mbps download. None of the proposed locations have speeds of even 10/1.

   NTUAW is proposing to deploy a last mile network that will initially deliver broadband speeds of symmetrical 1 Gbps in each of the areas. The proposed network can be easily upgraded to deliver speeds of symmetrical 10Gbps. Therefore, NTUAW is proposing to deploy a network that is not only capable of delivering speeds that are more than 1,000 times faster but future proof for the foreseeable future.

   Because the proposed service area consists of geographically isolated tribal communities economically distressed areas the cost of deploying broadband infrastructure is prohibitive and lacks a business base to justify investment. Therefore, absent grant funding, such as the Arizona Broadband Development Grant funding, these communities will remain unserved and fall further behind on the wrong side of the digital divide.

2. According to NTIA data (set forth in table below), the average percentage of households without internet access is an astounding 76.6% and the percent of population whose income in the past 12 months is below the poverty level in the proposed service area is 40.9%.

   In addition to bridging the digital divide, NTUAW is equally committed to bridging the affordability gap on the Navajo Nation. NTUAW has been providing discounts to thousands of customers on the Navajo Nation, under the Federal Lifeline Program for almost a decade. Additionally, NTUAW has been participating in the FCC's Emergency Broadband Program (EBB) and will participate in the Affordable Connectivity Program (ACP) as we transition to this new program. As indicated in the Navajo Nation DODE Letter of Support, NTUAW is committed to offering an affordable rate plan to any households that do not qualify for broadband discount under these programs.

Number of Households, Businesses, Anchor Institutions and Population that will benefit from the Proposed Project

Community Name	Households Served	Businesses Served	Anchor institutions Served	Total Population Served
Rough Rock NHA	42	0	0	205
Tuba City NHA	335	0	0	1779
Steamboat Community	58	1	4	102
Cornfields NHA	66	0	0	180
Birdsprings NHA	48	0	1	164
TOTAL	**549**	**1**	**5**	**2430**

1. Total Number of households that will be served at completion of project: 549
2. Total Number of businesses that will be served at completion of project: 1

3. Total Number of anchor institutions that will be served at completion of project: 5
4. Total Population that will be served at completion of project: 2,430

As indicated in the Application, the vast majority of the households that will be served are Navajo Housing Authority public housing units. According to Navajo Housing Authority data

- 9% of households on the Reservation are heated by wood or pellet stoves. Only 2% of homes nationwide use on-site heating;
- One in every four homes comprise of only one room dwelling;
- Over one- half of households on the Navajo Nation have no indoor water plumbing that require water transportation/hauling for domestic purposes;
- Over half of all families living within Navajo tribal lands have either no indoor or incomplete bathroom facilities and no or incomplete kitchen facilities. In contrast, the United States as a whole, 99% of housing units possess complete bathroom and kitchen facilities.

Therefore, the fact that 76.6% of the Households in the proposed service area lacks internet access is not a surprise. As described previously, NTUAW already provides discounts to thousands of low income households on the Navajo Nation under the FCC's Lifeline and Emergency Broadband benefit Programs.

Proposed Rate Plans

NTUAW will offer multiple rate plans that are priced below the national average as determined by the FCC's urban survey.

Choice NTUA Wireless Residential Fiber Products				
Pricing	Cost	Download Speed	Upload Speed	Usage
Choice Broadband	$65	50	50	Unlimited
National Average	$102			
Choice Broadband	$85	100	100	Unlimited
National Average	$106			
Choice Broadband	$105	500	500	Unlimited
National Average	$132			
Choice Broadband	$125	1 Gig	1 Gig	Unlimited
National Average	$141			

The Anticipated Economic Development Benefit Achieved by Construction of Such Improvements

As depicted in the table below, 4 out of the 5 project will improve broadband in economically distressed communities and the other will be in an at-risk community. Broadband is essential to improve and expand opportunities for education, employment and income growth.

The desired outcomes of the Proposed Project are to provide affordable broadband service to tribal members, create permanent jobs through the digital economy for Tribal residents, and to bring new opportunities for remote learning, telemedicine, and remote work through a scalable future proof network

For tribal residents, the internet is also an essential tool for cultural survival, acting as a hub for language preservation and connecting youth and adults with Elders, mentors and other networking resources.

This Project would not only bring critically needed infrastructure, but more importantly, assist the Tribal community to lift itself out of poverty, by providing the residents with the same educational, public safety, medical and job opportunities that most Americans take for granted.

	Tuca City	Rough Rock	Steamboat	Cornfields	Bird Springs
Zip Code	76045	86503	86505	86505	86047
Distress Score	74.7	96	99.9	99.9	93.2
Economically Distressed Community	At Risk	Distressed	Distressed	Distressed	Distressed
No High School Diploma	17.5%	22.2%	24.8%	24.8%	24.2%
Adults Not in Workforce	43.0%	56.7%	54.0%	54.0%	52.4%
Median Household Income	$44.8K	$27.1K	$24.6K	$24.6K	$37.9K

Total Miles of Fiber to be installed

The proposed project will deploy 55,026 feet of Fiber Optic cabling in the proposed service area.

Location of New Fiber

The proposed project will deploy Aerial and Underground fiber leveraging its parent company NTUA electric poles and conduit.

Commitment to Operate and Maintain the Network for a Minimum of Five (5) years upon Completion of the Improvements

NTUAW Commits to operate the proposed network and provision services at grant speeds for a period of at least five (5) years utilizing the proposed network.

The Party or Parties that will perform the Infrastructure Construction

NTUAW's parent, the Navajo Tribal Utility Authority will construct the middle mile extension in Rough Rock, AZ. NTUA has successfully constructed and operates a middle mile network that is over 550 miles across the Navajo Nation that spans 3 states.

NTUAW's affiliate company Commnet AZ, LLC will construct the last mile networks in each of the communities identified in the proposed service area. Commnet AZ, LLC has constructed and operates fiber networks in rural Arizona. Commnet AZ, LLC successfully completed its build out in Page, AZ utilizing ACA broadband grant funding.

The Intended uses of the ABDG Rural Funds in respect to the Construction or Planning

Grant funds will be used only for infrastructure deployment. Infrastructure deployment costs include Materials cost, costs for purchasing equipment and software, and staging, engineering and construction costs.

Information Required under Section 1.4 (to the extent relevant)

NTUAW confirms that

1. The proposed network is capable of providing the required grant speeds of at least 100Mbps upload and 100 Mbps download to all households identified in the Application.
2. The Company will operate the proposed network and provision services at grant speeds for a period of at least five (5) years utilizing the proposed network.
3. Company will complete the project within 24 months of the award date.
4. Company will not utilize duplicative funding from other federal programs to deploy the proposed network.
5. Company is capable of executing a contract within 60 days of notification of grant award.

Project Approach and Timeline for Completion of the Infrastructure Improvements

Company will complete the project within 24 months of the award date. A detail gantt chart is attached hereto (*see Documentation of Commitments Folder*).

Matching Funds

NTUAW commits to provide a cash match [redacted], upon being awarded the grant, utilizing the company's net liquid assets for this project (*see Documentation of Commitments Folder*).

The Nature and Scope of the Proposed Project

1. The Proposed Project will consist of construction of 55,026 feet of aerial and underground fiber optic cable.
2. The construction will consist of fiber-to-the-home last mile networks to five (5) unserved, high cost, hard to serve communities located on the Navajo Nation. The construction in Rough Rock, AZ will include a build out to connect to NTUA's existing middle mile network.
3. The proposed network design is for a XGS GPON Network Fiber-To-The-Home architecture to deliver high capacity Internet Access to the locations identified in the Application.
4. NTUA Wireless proposes to initially offer service plans starting at symmetrical 50 Mbps up to symmetrical 1 Gbps that can be scaled up to 10 Gbps in the future to create a future proof network for the foreseeable future.
5. The Proposed Project will leverage NTUA's middle mile to lower deployment costs and expedite the constructions time frames.
6. Additionally, NTUAW will to utilize existing infrastructure to place its fiber to lower make ready costs and expedite the tribal rights of way/permitting time frames.
7. NTUAW is equally committed to bridging the affordability gap on the Navajo Nation. NTUAW will provide eligible customers under the Federal Lifeline Program and the FCC's Affordable Connectivity Program. NTUAW is also committed to offering an affordable rate plan to any households that do not qualify for broadband discount under these programs.

Nature of Proposed Improvements and Type of Technology to be used

1. The proposed network design is for a XGS GPON Network Fiber-To-The-Home architecture based on XGS Gigabit Passive Optical Network Access Protocols back to a localized cabinet. The traffic is aggregated at the cabinet and routed back to a centralized data center over NTUA

leased fiber transport where internet access is provided with locally redundant and diverse internet service providers.

2. The GPON network consists of an Optical Line Terminal (OLT) located at the central office and the Optical Network Terminal (ONT) located at the customer's premises. Between them lies the Optical Distribution Network (ODN) comprised of fibers and passive splitters or couplers. A splitter is a device that divides an optical signal into two or more signals, each carrying a selected frequency range. It can also reassemble signals from multiple signal sources into one signal.
3. The GPON technology is based on Passive Optical Network (PON) technology. Traditionally, telecommunication networks use devices that require power to transmit data from one point to another including processors, memory chips, repeaters, and relays. With passive optical networks, components that need power to transmit data between the central office and the customer premises are replaced by passive components that guide traffic based on splitting optical wavelengths to end points along the way. These passive components, such as splitters and coupler devices, work by passing or restricting light and do not require power to transmit data. In a PON, a single piece of fiber can be run from the serving exchange out to a subdivision or office park. Then, individual fiber strands can be run to each building. Also, serving equipment can be split from the main fiber using passive splitters or couplers. This allows one piece of fiber cable from the exchange to the customer to be shared by many customers, thereby dramatically lowering the overall costs of deployment.

Type of Construction to be undertaken (aerial or underground)

The proposed project will deploy Aerial and Underground fiber leveraging parent company NTUA electric infrastructure the greatest extent possible to lower deployment costs and expedite permitting and deployment time frames.

Qualifications of the vendors/contractors

NTUAW's parent, the Navajo Tribal Utility Authority will construct the middle mile extension in Rough Rock, AZ. NTUA has successfully constructed and has been operating an extensive middle mile network that spans over 550 miles for almost a decade. NTUA is the largest multi-utility enterprise owned and operated by an American Indian tribe.

NTUAW's affiliate company Commnet AZ, LLC will construct the last mile networks in each of the communities identified in the proposed service area. Commnet AZ, LLC has constructed and operates fiber networks in rural Arizona. Commnet AZ, LLC successfully completed its build out in Page, AZ utilizing ACA broadband grant funding.

NTUAW has staff on hand, located on the Navajo Nation, able to service and repair any Fiber break or Network outage that may occur. All NTUAW Staff that will assist with the deployment have been trained on the proposed technology that will be deployed and will be fully informed of the project requirements before deployment.

Redundancy and Reliability

The proposed network will utilize a G.8032 Ethernet Protection Ring Protocol that enables self-healing capability and provide for backup power at the network nodes. Additionally, the design has two diverse paths to the internet to both Phoenix AZ and Albuquerque, NM.

Project Outcomes

The proposed service areas are economically distressed areas.

- The average distress score in the combined area is 92.7.
- The average poverty rate in the combined are is 40.92%.
- The average median household income in the combined area is $31.8K;
- The average percentage of Adults not working in the combined area is 52%;
- The average percentage of persons without a high school diploma is 22.7%;
- The average percentage of homes without a broadband connection in the combined area is 76.6%.

The primary objective of the proposed project is to deploy a reliable, scalable, and future-proof broadband network that can bridge the digital divide for the foreseeable future with affordable broadband services in one of the most remote, isolated, high cost, hard to serve areas in the entire United States. The proposed service area has not been served because of the prohibitive cost of deploying a broadband network.

The desired outcomes of the proposed project are to provide affordable broadband service to tribal members, create permanent jobs through the digital economy for Tribal residents, and to bring new opportunities for remote learning, telemedicine, and remote work through a scalable future proof network. For tribal residents, the internet is also an essential tool for cultural survival, acting as a hub for language preservation and connecting youth and adults with Elders, mentors and other networking resources.

Therefore, the proposed project would not only bring critically needed infrastructure, but more importantly, assist the Tribal community to lift itself out of poverty, providing the residents with the same educational, public safety, medical and job opportunities that most Americans take for granted.