

Broadband USA Applications Database

Applicant Name: Towerstream I

Project Title: TowerStream Last Mile Project for Wireless Broadband - Denver

Project Type: Last Mile

Executive Summary

A. Opportunity the proposed system seeks to address TWER is an urban Last Mile project addressing the following BTOP statutory purposes: (i) Improving access to broadband service to consumers residing in “underserved” areas of the United States; (ii) Improving access to, and use of, broadband service by public safety agencies; and (iii) Stimulating demand for broadband, economic growth, and job creation. TWER owns its tower network, and is not dependant on a local exchange-carrier network of phone wires or other cable systems to provide Internet service. TWER’s wireless approach avoids the significant disadvantages associated with using the traditional broadband approach, namely (i) the high installation costs associated with a “wired” installation that requires underground excavation, (ii) the significant additional time required to complete a “wired” underground installation, and (iii) disruption of vital public safety services through cable interferences and interruptions. In accordance with the statutory purposes of increasing demand for broadband, economic growth, job creation, and improving access by public safety agencies, TWER will provide a fifty percent (50%) pricing discount to public safety agencies and disadvantaged small businesses (SDB). The pricing discount will help public safety agencies reach more of their constituents, provide service more effectively, and expand the number of services that they can offer. It will help SDB’s expand their customer base, improve the quality of their service, and increase their ability to compete in the marketplace. Both SDB’s and public safety agencies will be better positioned for success over and beyond the course of the grant.

B. General description of the proposed funded service areas The proposed funded service area includes twenty zip codes. There are a total of 42,332 households covered with average incomes ranging between \$28,247 to \$32,853. There are an estimated 9,696 businesses in the proposed funded service area. The demographic of the area can be typically defined as vulnerable minority population. The percentage of households with an education level less than the 9th grade ranges from 2.8% to 79.4% with a blended average of 28.6%. The percentage of households with a high school graduation level of education ranges from 4.6% to 22.4% with a blended average of 15.6%.

C. Number of households and businesses passed The number of households passed totals 2,432. The number of businesses passed totals 557. The number of strategic institutions passed totals 145.

D. Number of community anchor institutions, public safety entities, and critical community organizations passed and/or involved with project Strategic institutions passed include educational institutions (totaling 18), healthcare facilities (108), libraries (3), safety agencies (8), and government agencies (8). We expect a total of 80%, or 116, of these entities to subscribe to the broadband service provided under this project.

E. Proposed services and applications for the proposed funded service areas and users TWER plans to provide its service to households through partnerships with consumer organizations and on a resale basis to other service providers. TWER’s pricing is lower

than other broadband companies and is comparable to that of other residential service providers such as Clearwire. TWER will offer its services to businesses at pricing well below that offered by the large, fiber based telecommunications companies. In addition, TWER is able to offer customized bandwidth at any level from .512 Mbps to 1000 Mbps. Most providers have no product offering between 1.5 Mbps and 45 Mbps. TWER plans to offer a 50% discount to public safety agencies and SDB's.

F. Approach to addressing the non-discrimination and interconnection obligations TWER displays its non-discrimination and network interconnection policies on its web page and internally. TWER adheres to the minimum interconnection requirements as stated in the BTOP NOFA. TWER follows the principle of "network neutrality." TWER does not filter, prioritize, or de-prioritize Internet traffic in any way. TWER supports actions such as caching and application-neutral bandwidth allocation which are measures to address spam, denial of service attacks, and illegal content. TWER complies with applicable statutes such as the Communications Assistance to Law Enforcement Act (CALEA). TWER encourages interconnection with other providers utilizing peering points and similar arrangements. TWER provides open access to intermediate and end-users, and is committed to offering wholesale prices and access at reasonable rates and terms. It is committed to binding private arbitration of disputes concerning interconnection obligations.

G. Type of broadband system that will be deployed TWER delivers Internet access using fixed wireless and WiMAX 8 technologies. TWER locates point to multipoint (PTMP) base stations connected to sector antennas on building roof tops, broadcast towers, radio towers or cell towers that transmit radio frequency from our Points of Presence (PoP) to the subscribers. The base station is then connected to an IP standards based infrastructure consisting of switches and routers. The customer's traffic is then routed through the TWER network to the closest available egress point to the public Internet. On average, customer traffic takes less than 20 milliseconds (ms) to reach the public Internet. A PoP build out consists of 2 cabinets or racks. Each rack has integrated cable management. The racks are built with a DC power system with a battery back designed for approximately 4 to 8 hours of run time. AC power converters are used when needed. Connections to back-up power generators are installed when generators are pre-existing at the facility. Two fully redundant routers are used in the implementation. The first router acts as a simple device to connect up to 48 network devices and is scalable up to 288 devices. The second router makes all the routing decisions and is capable of processing over 10 million routes per second. PTMP bases stations are rack mounted and connect directly to the routing platform. Point to Point (PTP) high capacity microwave links are used to connect the PoPs or roof tops. The microwave links are easily upgradeable for further capacity needs. Existing backhaul providers include Cogent and Level3. TWER uses a wide range of licensed and unlicensed spectrum frequencies. TWER's Service Level Agreement (SLA) guarantees (i) 99.99% network availability, (ii) less than 75ms round trip delay on the TWER backbone and less than 50ms round trip delay on TWER last mile, and (iii) packet loss less than 1% on the TWER backbone. TWER's speed is scalable from 0.5Mbps to over 1Gbps (1000Mbps), often with no equipment changes needed. Customers can increase their speed on demand easily, and with little to no delay. The network is designed with multiple points of failure to prevent downtime. Multiple fiber links, wireless links and hardware redundancy are built into the core to support the SLA's guarantee stated above. PoP locations take approximately 12 weeks to construct, and can serve a 10 mile radius area. Individual customers can be installed in as little as 24 hours. Existing PoPs can be upgraded with new equipment in a modular style without making major changes to the network, and are as simple as adding additional antennae on each PoP and at new

customer sites. H. Qualifications of the applicant that demonstrate the ability to implement and operate a broadband infrastructure, and/or be a sustainable broadband services provider TWER has almost a decade of experience implementing, managing and operating broadband services networks. Since 1999, the Company has established wireless broadband networks in nine major metropolitan markets including: New York City, Boston, Los Angeles, Chicago, San Francisco, Miami, Seattle, Dallas-Fort Worth, and the greater Providence area where the company is based. TWER's track record in existing markets allows it to efficiently, cost effectively, and quickly deploy services to new areas utilizing existing resources, staff, equipment, management protocols and established operations. The TWER organization is "shovel ready." TWER senior management has a strong record of managing complex projects and successfully leading organizations during periods of rapid growth. Management is supported by a highly skilled team of dedicated professionals who have significant experience implementing, managing, and operating a broadband services network. TWER's 140 employees work in teams dedicated to Field Engineering, Customer Care, Engineering including Network Operations, Finance including Human Resources and Information Technology, and Sales including Sales Support. I. Overall infrastructure cost of the broadband The overall infrastructure cost is \$9,704,194. The Company match is 30%, or \$2,911,258. The Grant request is \$6,792,936. J. Overall expected subscriber projections for the project Over the five year term of the project, subscriber projections total 25 for businesses, 681 for households, and 116 for strategic institutions. K. Number of jobs estimated to be created or saved as result of this project TWER expects that the project will generate a substantial number of jobs over the five year term. The Company expects to hire 17 employees and projects that its vendors will directly and indirectly hire 12 employees. TWER projects that the delivery of broadband service to the proposed funded service area will directly and indirectly create 4,054 jobs. TWER projects that the project will save an additional 2,027 jobs as businesses realize efficiencies and growth from broadband access.