Attachment A Project Description

Executive Summary

BlackBelt Technologies (BBT) is a Woman Owned Disadvantaged Business Enterprise (WODBE) specializing in the delivery of technological products and services to governmental, healthcare and educational institutions within the black belt region of the southeast. We believe that technology is the foundation and basis for systemic lasting cultural change. Systemic advancing change occurs when driven by technological imperatives that seeks to address the disparity between the urban and rural communities in government, education, business, entertainment and healthcare. This disparity in products and services can be simply summed as "Access". Access to Resources, Access to Information, Access to Adequate Primary Diagnostic Healthcare, Access to Quality Education, and Access to Employment Opportunities. We believe that access to information and technology is the dynamic force that has the potential and capacity for the transformation of this region and bridge the gap between poverty and prosperity, life and death, illiteracy and literacy, as well as, under-employment, unemployment and employment. BlackBelt Technologies is committed to the mission of providing the possibilities and opportunities for advancement within our communities through the transforming effects of technology in education, medicine and government. We therefore, seek partnership with ADECA in the delivery of "Technological Opportunities" to a region that has systematically been un-served and under-served by corporations throughout history. The fulfillment of our promise to this community begins with the basics which is infrastructure. Our request for assistance for this community is to facilitate the design and implementation of a hybrid wireless/fiber based network infrastructure to provide network connectivity to approximately 200 homes within Orrville and its surrounding communities.

Problem Statement

How do we effectively change the tide of inadequacy and ineffectiveness in regions with limited visibility, access and exposure? The City of Selma was a center of hope and change a few decades ago but today is languishing in despair and in need of a revitalization of vision and opportunities. This revitalization started with the implementation of a City broadband network. BBT engineered, installed and currently provides network management and maintenance of the municipal network. The focus and goal of this network is to provide a "Bridge to the Future" for subsequent generation of residents.

The median income of Selma is approximately $21, 300 and opposed to the U. S. average of approximately $42, 000 annually. This disparity has led to a significant gap in the offered services by telecommunication corporations and Internet Services Providers.

This gap in offered services has led to inadequate and/or no facilities for access to web based educational services, economic development and employment opportunities, work-force training, timely diagnostic health care and professional development. BBT's methodology for address the inequities through the provisioning of facilities, marketing of products and services through community and regional partnerships, education, training and employment of the targeted demographic. Our proposal leverages the network resources of the City of Selma in the delivery of broadband connectivity to the Town of Orrville and its surrounding communities.

Service Areas

BlackBelt Technologies is proposing to continue its efforts and mission in the development of this region through the provisioning of advanced broadband infrastructures within the town of Orrville. Orrville is located in western Dallas County approximately 15 miles from the city of Selma. We are proposing the implementation of a Mobile Resources Center for the town of Orville and the following communities directly adjacent to the town:

- Five Points
- Hazen
- River Oaks
- Beloit
- Dalewood
- Marion Landing
- Cahaba

As of the census of **2010**, there were 230 people, 105 households, and 59 families residing in the town. The population density was 222.5 people per square mile (86.2/km²). There were 118 housing units at an average density of 114.2 per square mile (44.2/km²). The racial makeup of the town was 51.30% White, 48.26% Black or African American, and 0.43% from two or more races. 0.43% of the population were Hispanic or Latino of any race. There were 105 households out of which 20.0% had children under the age of 18 living with them, 42.9% were married couples living together, 10.5% had a female householder with no husband present, and 42.9% were non-families. 41.9% of all households were made up of individuals and 19.0% had someone living alone who was 65 years of age or older. The average household size was 2.19 and the average family size was 3.03. In the town, the population was spread out with 19.6% under the age of 18, 7.0% from 18 to 24, 26.1% from 25 to 44, 26.1% from 45 to 64, and 21.3% who were 65 years of age or older. The median age was 43 years. For every 100 females, there were 88.5 males. For every 100 females age 18 and over, there were 85.0 males. The median income for a household in the town was $28,571, and the median income for a family was $31,719. Males had a median income of $29,583 versus $30,000 for females. The per capita income for the town was $15,418. About 9.9% of families and 15.7% of the population were below the poverty line, including none of those under the age of eighteen and 22.2% of those sixty-five or over. We will market our access services to all segments of the above-listed population. We will be targeting at-risk communities and anticipate a 75% adoption rate especially the K12 district, local ministries, after school facilities, higher education, local, state and federal agencies and community out-reach programs.

*Please reference attached letters of support

Qualifications

BlackBelt Technologies as a corporation is currently advancing the introduction, adoption and implementation of affordable broadband collaborative technologies and services throughout the state of Alabama with its emphasis being the unserved and under-served areas of the State. Technologies centered around web-based collaboration, establishment of distance education, network and storages appliances, video and voice collaboration, security and network management. We are uniquely partnered with local government, K12 school districts, municipal security, public housing and rural health organizations. We have over 60 years of combined experience in the delivery of technological products and services to clients in this region of the U. S. Additionally, we have well-defined long-standing partnerships with industry leaders in the development, manufacturing, implementation and usage of Internet technologies. BlackBelt Technologies has the corporate and regional experience and a proven track record in the marketing, engineering, development, management, integration and usage of these technologies and services. Reference the attached resumes for industry experiences.

Employment Opportunities

BlackBelt Technologies will employ regional personnel in support of the 7x24 operations capabilities of each of the facilities. Technicians will be certified and trained in networking, security, management, maintenance and operation of all technologies and services offered to regional subscribers.

The Project

BlackBelt Technologies is proposing the implementation of a hybrid fiber/wireless broadband technology for the town of Orrville and its surrounding communities. The project encompasses the establishment of a Network Point of Presence (NPOP) at the town's central water tower adjacent to the town hall, an internet access backbone network for backhauling internet based network traffic and subscriber client devices positioned on each subscriber site.

Internet Access POP

We are proposing the installation of a 48 strand fiber optic backbone cable between the centralized water to the cellular tower on Broad Street. Pine Belt Wireless provides fiber POP at the cellular tower. We will install a single 48 count fiber link between the cellular tower and the water tower. The length of this fiber run is no greater than 1 mile. The link will be terminated at the Water Tower with MikroTik Routers and Pine Belt will do a fiber handoff at the Cellular Tower. Figure 1 provides a visual of the logical fiber path between the towers.

Figure 1: 48 Count Fiber Backbone Between Towers

Network POP (Water Tower Design)

The water tower's centralized position will serve as the hub for the distribution of network access to all homes, anchor institutions, businesses, churches and educational facilities. We will deploy Point-to-Multipoint wireless technologies around the perimeter of the water tower. Each unit has a capacity to serve up to 45 distinct locations. Our design model will limit this to no more than 25 distinct locations, this provides for optimum equipment efficient and maximum performance for each subscriber. Figure 2 provides a visual of the anticipated coverage for the community based on the usage of the water tower as the central distribution port for network access.

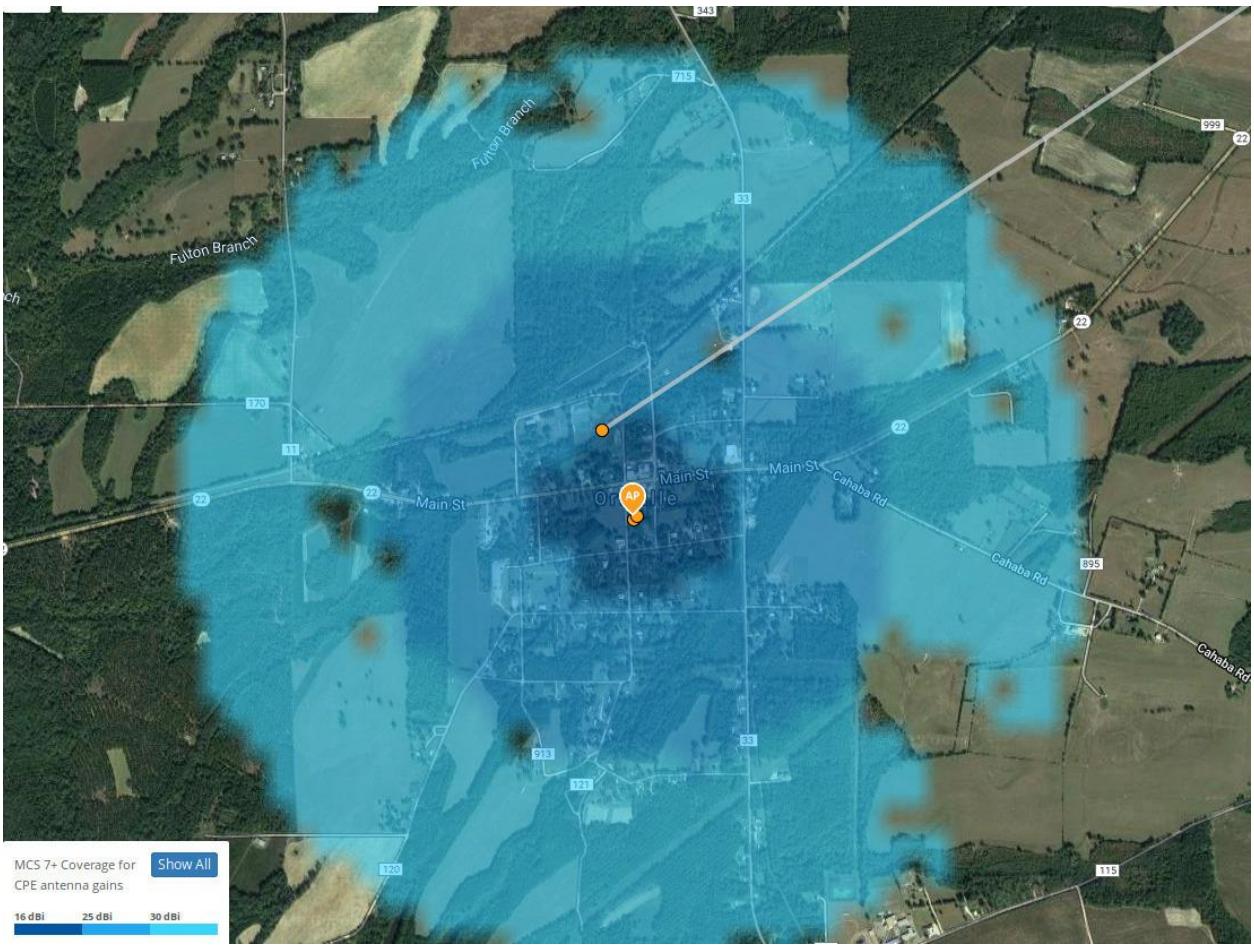


Figure 2. Broadband Coverage Map (Tower to Subscriber)

Figure A provides the overall subscriber design and the equipment projections required to guarantee adequate bandwidth for subscribers. The legend at the lower left corner of the design map provides equipment requirements for the subscriber facilities. The darker shades of blue require a lower antenna gain as opposed to the lighter shades of blue. The antenna gain requires range from 16dbi to a max of 30dbi. In order to provide complete coverage, we will be deploying 8 radios around the perimeter of the water tower.

Our manufacturer (Mimosa Networks) has guaranteed system and network performance using this model and based on the topology of the township.

The workhorse of the proposed will be comprised on the Mimosa A5c tower units. The Mimosa Network A5c has the capacity to provide 1Gig of bandwidth with a range of up to 23Km and operates at frequency ranges between 4.9 and 6.9 Ghz. The A5c will be equipped with a 45 degree connectorized antenna. The A5c provides Point to Multipoint connectivity for subscribers. The provides the greatest system utilization and performance for the subscriber locations. Figure B provides a visualization of this network topology. The A5c will be placed around the perimeter of the water tower at 30 degree intervals. This will guarantee complete connectivity for the entire township. The distribution of units will guarantee maximum capacity and performance per unit cost. This will be our initial network configuration. As additional capacity is required, we will be expanding based on the proximity of the capacity requirement.

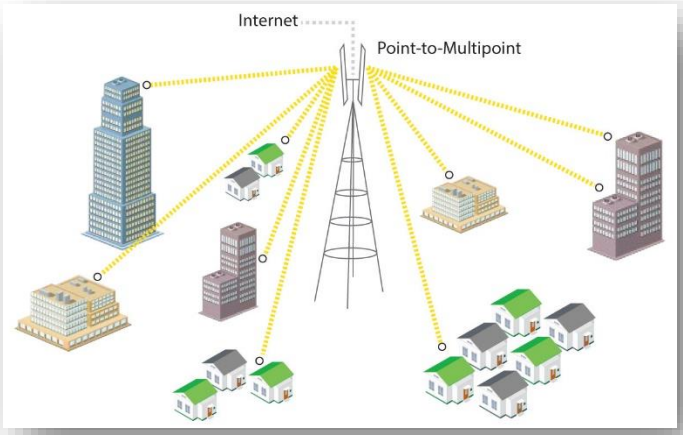


Figure 3: Point to Multipoint Topology Configuration Example

Subscriber Stations

The subscriber network is comprised of the Mimosa Networks C5x subscriber station and subscriber routers by Cambium Networks.

The Mimosa C5x is the industry's most versatile, integrated radio with four modular twist-on antenna options. The ultra-rugged solution provides extended frequency operation from 4.9–6.4 GHz, with best-in-

class noise immunity. Delivering the ultimate in flexibility and cost efficiency, the C5x is the go-to PTP or PTMP solution for 5 GHz deployments.

Encased in metal and leveraging custom-designed horn and Cassegrain antennas, the C5x reduces localized noise and provides immunity from interference with breakthrough front-to-back and front-to-side performance. Each antenna in the N5-X family is optimized to isolate noise with incredible sidelobe rejection. The C5x is the base subscriber platform and the antenna will be varied based on the design of the coverage area and the distance from the water tower.

The C5x will be affixed to each subscriber location and network connections will be installed between the Cambium Router and each C5x. The Cambium Router/Firewall will provide network connectivity and security for each subscriber

Logical Diagrams

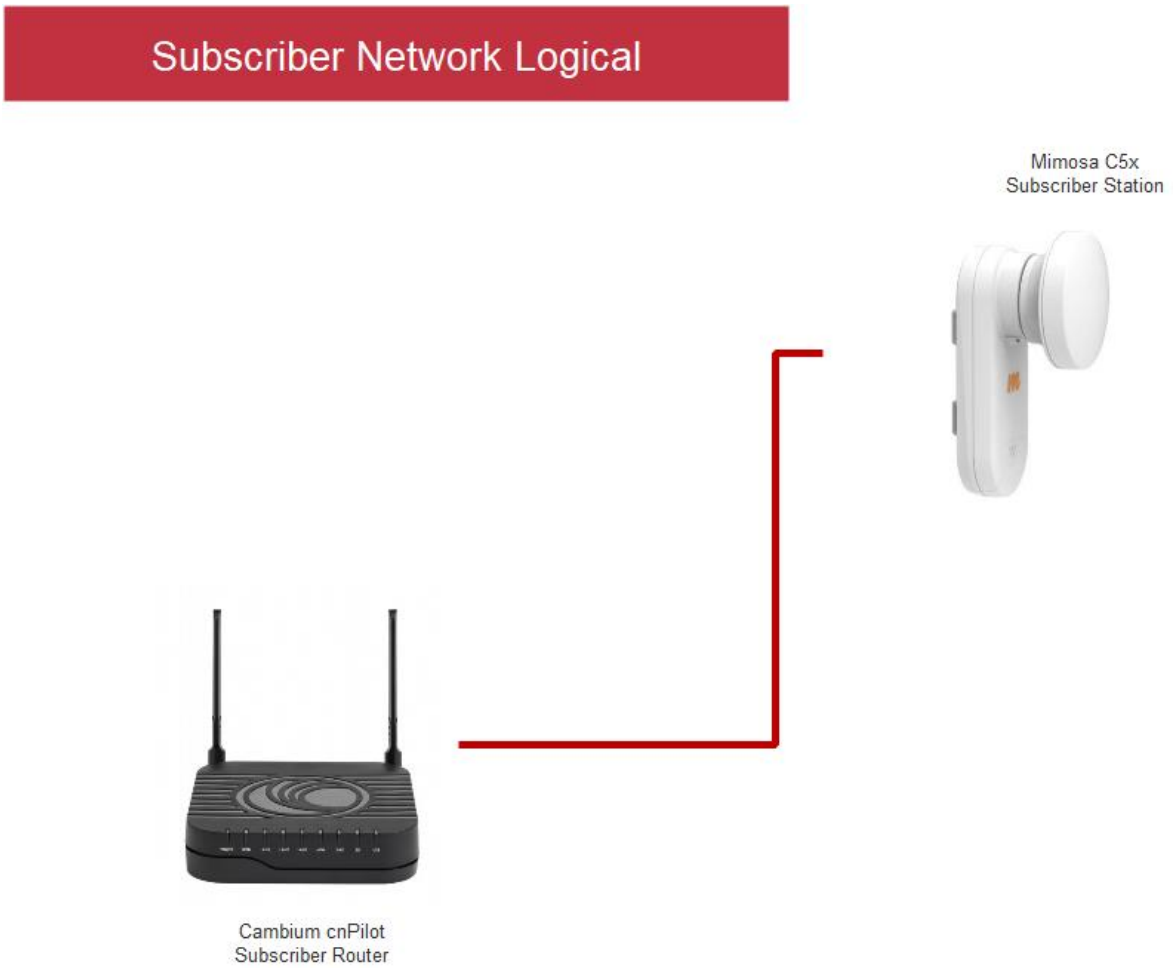
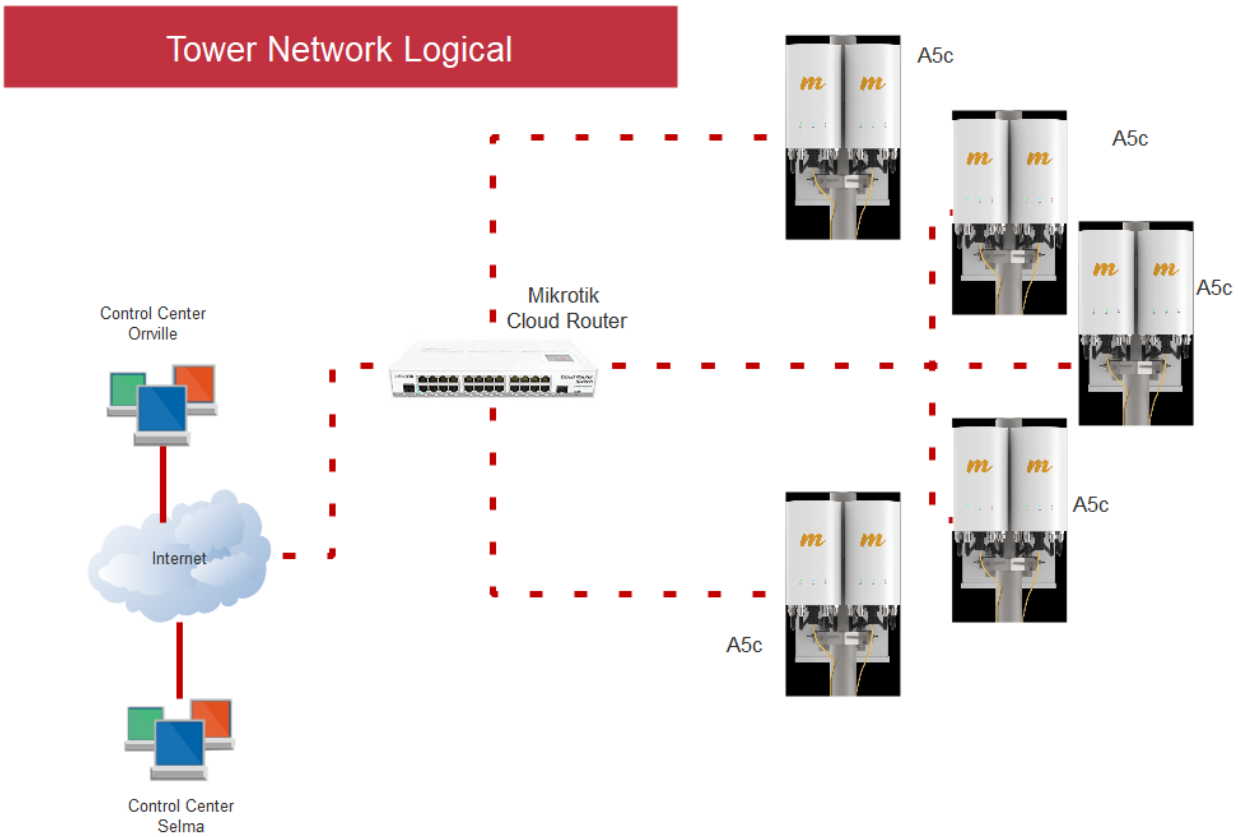
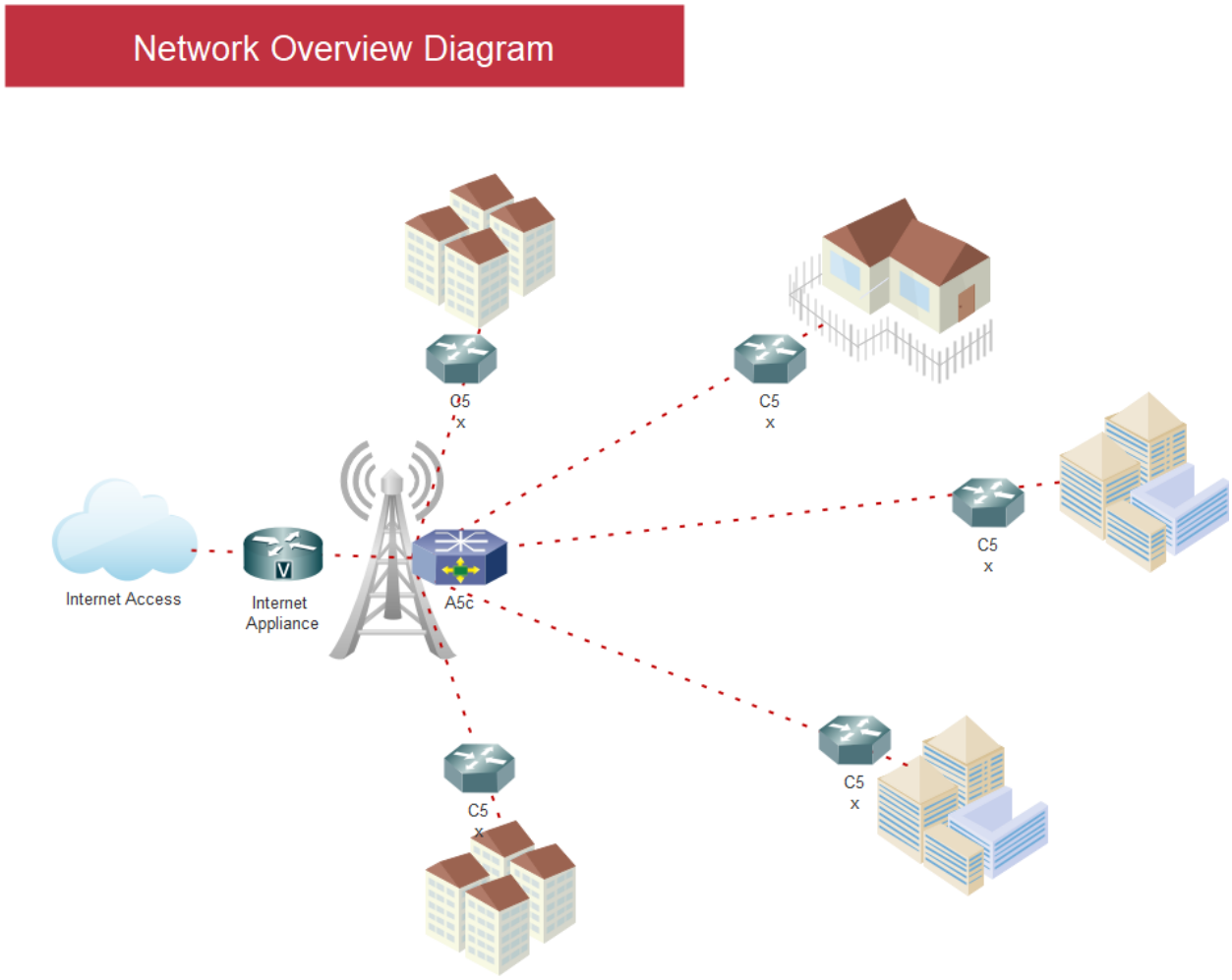


Figure 4: Subscriber Network Logical Diagram



The system will be comprised on dual network control centers or network operations centers. Each center will provide identical operational and control capabilities. The centers will be located at the Orrville City Hall and BBT's Selma Office.

System Overview Logical Diagram



Broadband Capabilities and Capacities

Basic Package	**Asymmetrical 25/10**	**39.95**
Business Basic	**Symmetrical 50/50**	**59.95**
Business Silver	**Symmetrical 100/100**	**69.95**

Upgrade Capabilities

Our proposed platforms will support up to 1Gbps per subscriber. As the demand for increase performance the upgrade path will be to increase tower capacity and internet bandwidth with the providers. Our initial tower design provide coverage overlap to shift subscribers to lower utilized A5c's. If demands exceed the current equipment capacities, we will increase tower equipment to redistribute the load across A5c's.

Project Area Maps

Reference Project Area Maps for a detailed depiction of the project service area.

Preliminary Technical Evaluation

The following diagram provides a listing of proposed services area. The yellow rectangle provides the boundaries of the proposed service area.

Preliminary Project Cost: $207,602

Project Schedule: The project will be completed within the 2 years requirement

Task		Time Allocation
Engineering Finalization		30 Days after Award
Fiber Buildout		90 Days after Award
Tower Buildout		45 Days after Final Engineering
Subscriber Buildout		8 Months after Tower Buildout

Management Experience

BlackBelt Technologies brings a wealth of managerial, operational and technical experience to the project. Our growth has been fueled by vision, determination and technical prowess of our corporate leadership team. Our leadership team is comprised of the following:

- Deborah Works (CEO & Managing Partner)
- Wayne Green (CIO & Managing Partner)

- Cheryl Pettaway-Colvin (Community Relations & Program Manager)
- Doug Ward (Construction Management Specialist)
- William Culver (Project Manager)

Reference the attached resumes for additional information on corporate experiences.