

Southeast Arizona

Broadband Business Case Analysis (BCA)

For

**Arizona Strategic Enterprise
Technology Office (ASET)**

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Southeast Arizona Broadband Business Case Analysis (BCA)

Preface:

High speed Internet is the new essential infrastructure for this century's job creation, educational and healthcare transformation, and economic development, just as highways, railroads, canals, electricity, and telephone were for previous generations. It is the 21st century's infrastructure challenge and it is becoming ever more critical that communities in Southeast Arizona have adequate bandwidth to help our local economies, create jobs, and improve education, healthcare, public safety, and quality of life.

Earlier this year saw the formation of a **Southeast Arizona Broadband Steering Committee** (http://www.cochise.az.gov/cochise_facilities.aspx?id=12402) with broad participation among regional economic development, educational technology, transportation, government IT, healthcare, and public safety stakeholders. The Committee and its activities are being funded, in part, by a federal broadband grant administered through the **State of Arizona's Digital Arizona Program (DAP - <http://azbroadband.gov/>)**.

Southeast Arizona has been selected to receive these funds to help advance broadband assessment, gap analysis, strategy, tactics, and application adoption in our region, Cochise, Graham, Greenlee, and Santa Cruz counties. **Systems Technology Staffing, LLC** has been hired for Community Planning support under the grant and their consultants are facilitating the Southeast Arizona Broadband Steering Committee, collecting and analyzing regional broadband and economic data, producing a series of reports, and otherwise assisting with this project.

There are several **Digital Arizona Program (DAP)** initiatives at the state level. The Governor's **Digital Arizona Council (DAC)** with their web presence at http://www.digitalarizona.gov/Digital_Arizona_Council/About_DAC.html meets quarterly and is working on an Arizona Broadband Strategic Plan. The **Arizona Broadband Map** portal (http://www.digitalarizona.gov/Maps/Arizona_Broadband_Maps.html) offer interactive insight to broadband coverage across the state and the community planning version integrates substantial demographic and economic data to aid policy analysis and planning. DAP has recently launched an **Arizona Broadband Speed Test** available for resident and enterprise use at <http://www.digitalarizona.gov/Survey/AffiliationQuestion.html> for gathering information about broadband coverage and performance across the State. They are strongly encouraging Southeast Arizona broadband stakeholders to take the speed test periodically and to also distribute the information and request to utilize among their respective stakeholder community.

The **Arizona Strategic Enterprise Technology Office (ASET)** coordinates these initiatives. Their office address is 100 N. 15th Ave. Suite 400, Phoenix, AZ 85007, and their main phone number is: (602) 542-2250. Additional information and resources may be found online at the ASET website: <http://aset.azdoa.gov/> and the Digital Arizona Program's (DAP) website at <http://DigitalArizona.gov/>. The DAP primary email address is question@DigitalArizona.gov.

Disclaimer: None of the information in this report should be construed as official public policy of Southeast Arizona's regional governments or the Arizona State government. However, funding to assist in producing this report came from a federal NTIA grant managed by an Arizona State agency.

Southeast Arizona Broadband Business Case Analysis (BCA)

Executive Summary:

The **Southeast Arizona Counties** that are the focus of this Broadband Business Case Analysis (BCA) include **Cochise, Graham, Greenlee, and Santa Cruz** with Cochise County leading the procurement and management of broadband consultant services. The **Southeast Arizona Broadband Steering Committee** was formed with broad participation among regional economic development, educational technology, transportation, government IT, healthcare, and public safety stakeholders to help ensure that the Southeast Arizona region has adequate bandwidth to help our local economies, create jobs, and improve education, healthcare, public safety, and quality of life.

This **Business Case Analysis (BCA)** focuses on digital capacity needs and availability for the Southeast Arizona region and selected communities within the region. The BCA and associated community broadband planning and technical assistance is funded by a federal grant awarded to the State of Arizona. Launched in 2009, NTIA's State Broadband Initiative (SBI) implements the joint purposes of the (Bush era) Recovery Act of 2009 and the Broadband Data Improvement Act of 2008, which envisioned a comprehensive program, led by state entities or non-profit organizations working at state direction, to facilitate the integration of broadband and information technology into state and local economies. Economic development, energy efficiency, and advances in education and health care rely not only on broadband infrastructure, but also on the knowledge and tools to leverage and use that infrastructure.

Input for this BCA for the four counties included the development of specific Community Data Sets, integrating these data sets with the Arizona Broadband Map, and identifying broadband providers and their respective services. Broadband speeds were obtained and analyzed for each county and their respective population centers from the FCC speed test, speedmatters.org, and Akamai (from their content delivery network's performance). The Service Providers and their respective service types were generated from the Arizona Digital Broadband Map. Current infrastructure including providers and services, and underlying rights-of-way resources such as utilities, roads, and rail routes are identified in the Community Data Sets and the complementary Broadband Technical Report..

The results of analysis from these data sources confirm that rural Arizona requires better high-speed broadband capacity. Given the expansive, often difficult rural terrain across the state of Arizona, community-serving organizations like libraries, public schools, and healthcare facilities often have difficulty accessing high-speed broadband services essential for education, commerce, and economic development.

Some 46% percent of Arizona households have connectivity at less than the National broadband definition of 4 Mbps download and 1 Mbps upload. Akamai data shows that Arizona ranks 45th in the nation with a 4.8 Mbps average speed experienced by broadband subscribers (second quarter 2012). There is significantly less availability of high-speed services in rural parts of the state compared to metropolitan areas. Unless something is done, this "digital divide" will only increase because modern Internet is becoming increasingly video intensive. The next generation of Internet and applications will be all about high definition video, requiring as much as ten times the broadband capacity of previous generation Internet uses. In addition, businesses will increasingly rely on cloud computing, web-conferencing with real time video for communications and collaboration, and telework,

each layering on the need for even greater broadband capacity. So previous definitions of sufficient Internet access speeds are rapidly becoming obsolete.

The Governor signed legislation during the 2011-12 session (SB 1402) that enables Arizona's state highway rights of way to be utilized to help build out badly needed middle mile broadband fiber capacity to rural areas of Arizona while supporting other high-capacity middle mile and long haul connectivity needs. A number of companies have expressed interest in utilizing the resources made available by SB1402. During the most recent legislative session, a telemedicine bill (SB 1353) was passed for payment parity for remotely delivered services, the implementation of which will simultaneously reduce medical costs, save lives, and improve rural economies by requiring health insurance providers to reimburse medical specialists for services provided via broadband-based telemedicine. And a data center bill (HB 2009) was passed to encourage regional placement of data center facilities via favorable tax policy.

Specifically, this Business Case Analysis (BCA) shows Southeast Arizona regions have limited broadband capacity, diversity, and backhaul capabilities. Minimum Sufficient Speed Threshold tables were identified for four major application areas, economic development, education, telemedicine and public safety. Even with speed thresholds as low as 10 Mbps download and 5Mbps upload, no community reviewed in these three Southeast Arizona regions could be considered as meeting threshold standards for all of these important applications. This is a critical issue that must be resolved for continuous economic development and improvements in education, healthcare and public safety to continue as well as for the general economic well-being of Southeast Arizona communities. The importance of doing this is because it will ultimately:

Foster local economic development by:

- Attracting new businesses plus retaining and expanding the current businesses
- Providing local jobs and developing new skill-sets necessary to increase employment and community sustainability in today's knowledge economy
- Supporting local entrepreneurs who engage with the global economy using broadband and the Internet to deliver goods and services around the globe

Improve educational success within local communities by:

- Increasing the effective use of interactive digital learning solutions such as self-paced learning and remote content resources for transformational education initiatives
- Providing distance learning and collaboration in classrooms, homes, and businesses for students of all ages with universities around the world
- Enabling real-time progress accountability for student and staff performance supporting early intervention and remediation

Improve health care availability and quality while lowering costs by:

- Using high-speed broadband connectivity for local doctors and healthcare providers to collaborate with remote specialists
- Improving local triage to reduce unnecessary transportation of patients to remote facilities
- Providing remote well-being check-ups from existing local facilities such as schools, libraries, etc.
- Providing enhanced in-home care with monitored sensors and video check-ups by remote health care providers

Improve public safety and save lives by:

- Delivering accurate real-time data to all first-responders as needed and across jurisdictional/agency boundaries and connecting ad-hoc groups on a per event basis

Conclusions and Recommendations:

Within each of four Southeast Arizona counties and their respective communities, regional broadband stakeholders should now put in place strategies and action plans, as described in the **Community Planning Guidelines and Recommendations** of this BCA to meet the emerging broadband capacity requirements to support the four key Internet application areas.

The central theme for these action plans is communication among all stakeholders. The importance of maintaining a dialogue between community stakeholder groups, including elected officials, and broadband providers to learn issues and strategize paths forward cannot be over emphasized.

These strategies and action plans will require Southeast Arizona broadband stakeholders to designate group leaders for each of the application focus areas or community-driven broadband remediation, as well as performing community-by-community gap analysis for each application. It will also require further identification of existing local infrastructure assets, service providers and services, and the formulation of ROI improvement strategies and plans for incentivizing provider investments in building or expansion of broadband resources with appropriate implementation plans.

Demand aggregation is an important means for incentivizing providers to provide improved broadband services to rural communities. This includes defining and aggregating the demands among public institutions, commercial enterprises, non-profits and residential users. Pledges of support to purchase better broadband services as they become available should be secured from the stakeholders whenever possible.

Use the resources available. This includes this BCA, the Southeast Arizona Broadband Technical Report, and the DAP Broadband Grants & Resources Guide, as well as continued services from Systems Technology Staffing. The Arizona Community Planning Broadband Map is an invaluable resource that needs to be promoted and utilized by all planning participants. The Arizona speed test should also be popularized and utilized.

Local leadership is essential in accurately defining broadband requirements and cultivating initiatives. Southeast Arizona should take the lead to identify champions to lead the action plans and to see that all stakeholders remain engaged. Cities and counties need to be involved because they control access to resources such as ROW that can alter the investment equation and are closer to local stakeholder interests. Representatives of the four application areas, economic development, education, healthcare and public safety, need to be further engaged to become and remain active participants in implementing the action plans defined in the Community Planning Guidelines and Recommendations. The community action plans for satisfying the identified requirements will lead to model projects for the communities. The broadband providers active in the region need to contribute to this process at each step and become a true partner in the communities' broadband solutions.

The driving force for each of these communities should be to incentivize investment by the private sector in the expansion and building of high-speed broadband technology and infrastructure by finding ways to enhance investor ROI calculations through:

- The aggregation of local demand,
- The identification of new uses and users,
- The reduction of right-of-way costs and use fees
- The reduction of time and costs relating to permitting and zoning processes

Taking these actions and creating mutually beneficial partnerships with private investors will lead to the building of better Internet resources community by community.

The Need for Expanded Rural Broadband Capacity:



One of many factors that support broadband enhancement projects include obtaining a clear view of the current digital capacity of an area, and what is required to support the steadily increasing demand of future applications. Creating such a baseline and community expectations is important because of the impact that increased broadband has on economic development.

Multiple studies have shown the connection between economic development and higher bandwidth. A 2011 Chalmers University study concluded that every doubling of broadband speed increased GDP by 0.3%. (Rohman, 2012) If this Chalmers University calculation is applied to rural Arizona's economy it potentially has the following impact:

- Arizona Annual GDP - \$277 billion
- X 15% (rural portion of Arizona GDP)
- X 0.6% (4 x increases in rural digital capacity - (1 Mbps to 4 Mbps or 4 Mbps to 16 Mbps) equals \$249 million potential Arizona Rural GDP Increase year over year just from digital capacity expansion.

High capacity broadband service providers and their respective services bring opportunities to these rural areas. The economic development trend for rural Arizona is dependent on small service businesses, designed to complement larger (often global) organizations. Without broadband, these small businesses will not be sustainable.

At the current time, downstream speeds of 10 Mbps and upstream speeds of 5 Mbps will adequately support the applications such as medical file sharing (basic), remote diagnosis (basic), remote education, enterprise productivity applications, consumer Internet use, sensor networks, and building control and management. These broadband uses impact the four application areas of focus for this report: Economic Development, Education, Telemedicine, and Public Safety use.

Below is a table of recommended speeds relative to specific applications. The recommended speeds analysis for digital applications comes from the California Broadband Task Force. It quantifies the requirements for various applications used for business, jobs, education, telemedicine and public safety. This analysis is applicable to Arizona. Adding credence to this, a letter released from Arizona's Superintendent of Public Instruction, John Huppenthal, recommends a speed standard of no less than 6 Mbps, Down and Up, for individual students, both at school and in their homes, because this enables the use of new Arizona based distance learning content, electronic curriculum delivery and real-time course-by-course testing and accountability tools. This closely correlates with the general indication expressed in the table below recommending 10 Mbps download and 5 Mbps upload to accomplish the more meaningful applications for Commerce, Health, and Education if communities are to benefit from or have access to the emerging Digital economy.

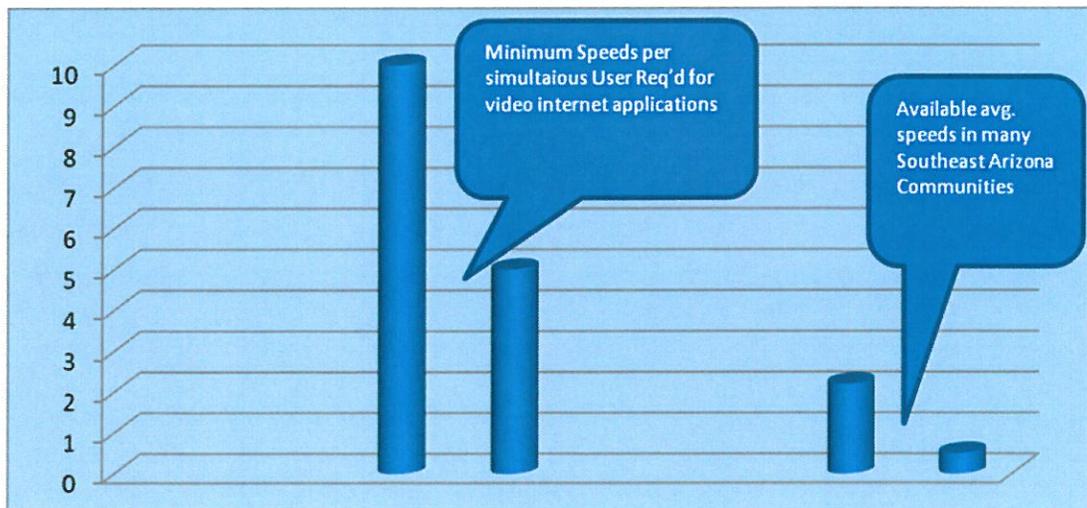
**Downstream and Upstream
Speed Range**

Applications

1 Mbps - .5 Mbps	Voice over Internet Protocol telephony, Basic email, Web browsing - (simple sites), Streaming music, Small display, Low quality video (highly compressed)
5 Mbps - 1 Mbps	Web browsing (complex sites), Email (larger file size attachments), Remote video surveillance, IPTV (Standard Definition), File sharing (small/medium), compressed broadcast video (1 screen), Streaming music.
10 Mbps - 5 Mbps	File sharing (large), IPTV-Standard Definition (3 TVs), Broadcast Standard Definition video, Video streaming (2-3 TVs), High Definition video downloading.
10 Mbps - 5 Mbps	Medical file sharing (basic), Remote diagnosis (basic), Digital Learning & Remote education (Common Core standards), Building control and management.
100 Mbps - 10 Mbps	Telemedicine, Educational Services (small schools), Broadcast video HD and some High-Definition, High quality tele-presence (distance learning), High Definition surveillance, Smart-Intelligent building control.
1 Gbps - 100 Mbps	High Definition telemedicine, Multiple Student Educational Services (large schools), Uncompressed High - Definition video, HD-IPTV (Many TV's), High Definition - Video on Demand. Gaming (immersion). 3D modeling.

An FCC National Broadband Plan milestone, by 2015 is, "100 million U.S. homes should have affordable access to actual download speeds of 50 Mbps and actual upload speeds of 20 Mbps." The National Broadband Plan further states: "The United States must lead the world in the number of homes and people with access to affordable, world-class broadband connections. As such, 100 million U.S. homes should have affordable access to actual download speeds of at least 100 Mbps and actual upload speeds of at least 50 Mbps by 2020, according to the national plan. For Community Anchor Institutions, the National Broadband Plan states: "Every American community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals, and government buildings." We have a long way to go.

**Modern Application Speed Recommendations to
Southeast Arizona's Average County Speeds Comparison**



The recommended sufficient speeds necessary to support economic development, education, telemedicine, and public safety applications are simply not available to meet the needs of various Southeast Arizona communities and stakeholders. Declared broadband coverage and tested speeds show substantial deficiencies against recommended application speed standards. Thus, going forward, the Southeast Arizona region needs to seek to enable the availability of sufficient digital capacity for each of the four critical applications, as well as general community well-being.

Additionally, the region also requires an effective *redundant* middle-mile infrastructure to protect and secure against area wide Internet outages, either natural or manmade. Recent experience shows the impact of the stranded nature of Arizona's Internet middle-mile network infrastructure, and the lack of fail-safe redundancy or adequate backup for emergencies. This has resulted in a number of Southeast Arizona communities experiencing downed 9-1-1 systems, and prolonged Internet outages resulting in millions of dollars in economic damage. Ideal digital infrastructure is constructed in rings or interconnects between network segments so if there is a cut in a line, the system can route traffic in other directions. All four Southeast Arizona counties and their associated population centers do not have sufficient redundancy to support their networks in the event of a line disruption or generally for what would be considered resilient broadband connectivity.

Education and Job Readiness:

The demands of the new information-based economy require substantial changes to the existing K-12 and higher education systems. The 21st century workplace requires both a better-educated and a differently educated work force to address the widening gap between the skills of graduates and modern workforce demands.

A good or arguably great **STEM (Science, Technology, Engineering, and Math)** education is critical for the best of today's and tomorrow's jobs. Since the economic recession, the recovery has been concentrated on workers with STEM and information technology skills. Most STEM jobs do not require a four-year college degree and have a high payout. And if a worker has a degree in a STEM field their salary is much higher. In a STEM based economy, job growth, wages, patenting, exports, and employment rates are all much higher. Another positive factor is a larger concentration of these jobs means less income inequality.

Our students are more tech savvy than any previous generation with smart mobile devices and portable and home computer systems of their own. More and more homework assignments, grades, progress reports and communication between teachers, students and parents are provided online through the cloud or eLearning Management Systems. Students without home Internet access easily fall behind. Parents without home Internet access have difficulty monitoring their children's academic progress, though involvement in their children's education is one of the most important factors in their success.

In a March 7, 2012, letter to Arizona State Legislators, Arizona Superintendent John Huppenthal stated: "The minimum speed that is educationally sufficient to support ADE's transformational plans is 6 Megabits per second per student. This speed enables uninterrupted video streaming and rapid downloads of education content whether a student is at home or at school". However, this Internet service speed offering is only available to 72% of rural areas and 57% of sparsely populated rural areas in the State. Until this deficit is corrected in rural areas, statewide plans for educational transformation cannot be fully implemented.

Thus, at the state and local level, we must seek to facilitate the implementation of underlying technologies, digital curricula, collaboration, and professional development to promote improvements in education and workforce development while serving the needs of a rapidly evolving statewide data based decision support system.

The Governor’s AZ Ready program and recent budget are reforming state education through the implementation of the **Common Core State Standards** (<http://www.corestandards.org/>) and associated standardized **Partnership for Assessment of Readiness for College and Careers (PARCC** - <http://www.parcconline.org/>) testing, upgrading classroom technology, and implementing a performance-based funding model to reward academic success. To support these goals, the **State Educational Technology Directors Association (SETDA** - <http://www.setda.org/>) recommends that all K-12 schools and districts meet the following minimum broadband targets between now and the 2017-2018 school year, as well as reach the goal of universal broadband access by students and educators outside the school:

Broadband Access for Teaching, Learning and School Operations	2014-15 School Year Target	2017-18 School Year Target
An external Internet connection to the Internet Service Provider (ISP)	At least 100 Mbps per 1,000 students/staff	At least 1 Gbps per 1,000 students/staff
Internal wide area network (WAN) connections from the district to each school and among schools within the district	At least 1 Gbps per 1,000 students/staff	At least 10 Gbps per 1,000 students/staff

On June 6, 2013 the White House unveiled a bold, new initiative called ConnectED to connect 99 percent of America’s students to the internet through high-speed broadband and high-speed wireless within 5 years, calling on the FCC to modernize and leverage its existing E-Rate program to meet that goal. The President also directed the federal government to make better use of existing funds to get Internet connectivity and educational technology into classrooms, and into the hands of teachers trained on its advantages. And he called on businesses, states, districts, schools and communities to support this vision. This ambitious initiative does not require Congressional action. ConnectED also better invests existing federal funds to ensure that every educator in America receives support and training in using education technology tools to improve student learning.

Improving Healthcare with Technology and Telemedicine:

Healthcare is 18% of our nation’s GDP and will cross 20% before 2020. In 2040 there will be twice as many Americans over 65 as there are now. Three-quarters of America’s health costs are for chronic conditions. There will be even greater physician shortages as this generation of doctors is retiring, especially in America’s rural areas. Twenty-five years ago all a doctor needed was a telephone with dial tone. Today a doctor needs enough bandwidth for real-time collaboration while viewing MRIs.

Health Information Technology (HIT) can reduce costs, increase physician productivity, and improve care by enabling near real-time access to patient records, giving rural patients remote access to medical specialists in urban areas, and is critical for appropriate, cost-effective, medical decision making. HIT plays a key role in advancing policy priorities that improve health and health care delivery including improving care quality, safety, efficiency, and reducing disparities. It can also enhance care coordination, engage patients and families in managing their health, and with remote monitoring, enable the aged and infirm to stay in their homes longer and enjoy a better quality of life.

Deployment of statewide efforts to increase electronic medical record (EMR) adoption and health information exchanges (HIE), rely on robust digital capacity for hospitals, medical offices, and our homes that is often lacking in rural and even urban environments. Thus, we must act in concert to facilitate the expansion of a robust statewide telehealth ecosystem and the implementation of a shared vision, strategic plan, and sustainable business model for the health network.

A critical element is the removal of barriers for appropriate reimbursement by health plans. This past session, Arizona passed a significant piece of legislation related to broadband in rural areas, SB 1353, the telemedicine parity bill. It requires private health insurers to provide coverage in rural communities for services delivered via telemedicine at a comparable rate to those provided in person. Services covered include trauma, burns, cardiology, infectious diseases, mental health disorders, neurological diseases and dermatology. Significant collaboration between healthcare stakeholders and telemedicine interests built a coalition and solid support for the bill.

The Arizona Health Information Exchange (HIE)

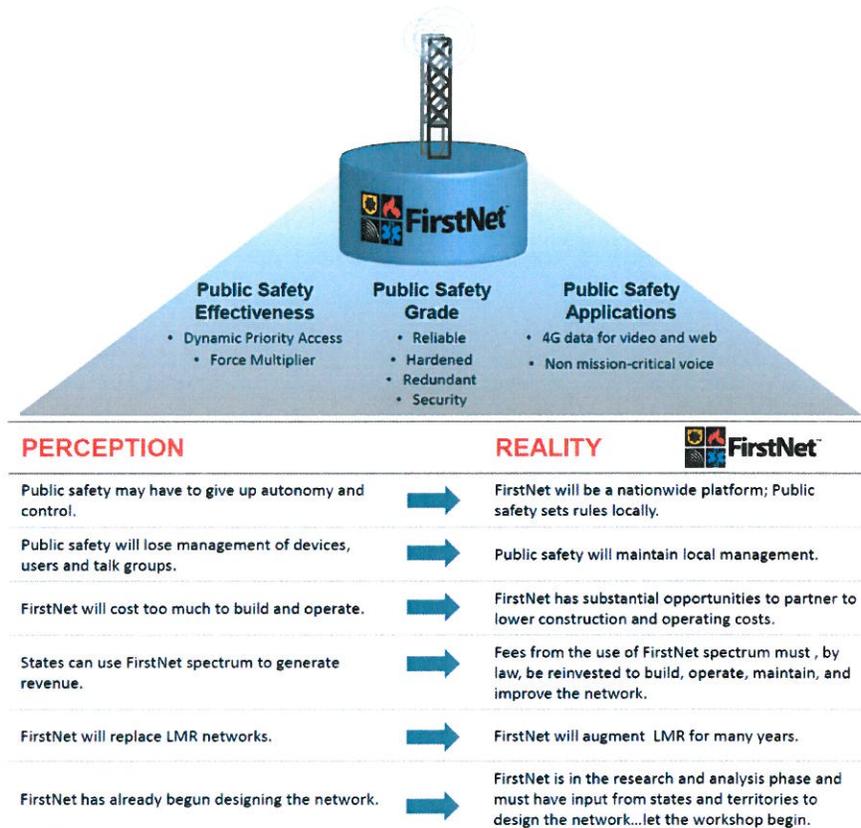


Public Safety Communications

Telecommunications has long been at the core of first responders' ability to operate, prevent emergencies, and respond swiftly when they occur. Mobile devices and broadband services can also provide the public timely and pervasive emergency information and assistance as well as new ways of calling for help. Unfortunately, the U.S. has not yet realized the potential of broadband to enhance public safety. Today, first responders from different jurisdictions and agencies often cannot communicate during emergencies. Emergency 911 systems still operate on circuit-switched networks. Similarly, federal, Tribal, state and local governments use outdated alerting systems to inform the public during emergencies. The U.S. also faces threats to the resiliency and cyber security of its networks.

The entire public safety communications landscape changed dramatically in 2012 with the passage of legislation creating the First Responder Network Authority (FirstNet) that will be responsible for the creation and maintenance the National Public Safety Broadband Network (NPSBN). States are working with FirstNet to develop the definition of requirements for their state's portion of the NPSBN and prepare a plan for the state's portion of the buildout. The network is required to be self-supporting following a fee-based business model and will provide ample opportunities for the sharing of both spectrum and hardware (tower space, conduit, etc.) in public/private partnerships.

Because of the passing of SB 1402, ASET's SBDD program is cooperating with ADOA's Public Safety Interoperable Communications (PISC) Office which has responsibility for FirstNet planning and outreach. This office also reports to the state CIO and is exploring the possibility of using SB 1402 and the mapping data generated by DAP for potentially lower FirstNet costs of expanding rural backhaul infrastructure for use by FirstNet while sharing those expanded resources to benefit educational, healthcare, and economic development uses in rural communities.



Positive Trends and Portents for Broadband Evolution:

The modern world has truly embraced the many blessings of high-speed connectivity to our homes and offices, as well as to our mobile life on the go. Fortunately many societal, market, and technological factors strongly align with and are driving increasing investment in broadband infrastructure and services. Some of them are briefly summarized as follows:

Industry and Market Broadband Trends and Portents:

- **Smart Phone & Device Penetration, Mobile Apps Explosion, and Social Media**
- **Strong Mobile Industry Investment in 4G Wireless Infrastructure and Capabilities**
- **New Middle Mile Fiber Projects Driven by Mobile Requirements and FirstNet**
- **Enterprise/Business Models, Processes, and Need for Real-time Collaboration**
- **Business to Business (B2B) and Business to Consumer (B2C) eCommerce**
- **Advent of Virtualization and Cloud Services for Applications, Content & Storage**
- **Continuously Increasing Consumption of Rich Media at Home and at Work**
- **Internet of Things and Machine to Machine (M2M) Communications Connecting Our World at an Ever Deeper and More Real-time Level**

National Broadband Trends and Portents:

- **Connect America Fund and Universal Service Funds (USF) for Broadband**
- **ConnectED to Complement Educational eRate for Common Core Readiness**
- **Connect2Compete and Other Non-Profit Broadband Initiatives and Philanthropy**
- **USDA Broadband Grants and Loans Continue**
- **FirstNet Public Safety Broadband Funding and Partnering Opportunities**
- **Libraries and Community Anchor Institutions Providing Broadband Support**
- **FCC Spectrum Reform and Market-Driven Regulatory Evolution**

Arizona Broadband Trends and Portents:

- **NTIA Broadband Grants for Mapping, Planning, and Projects**
- **Digital Arizona Program (DAP) and Digital Arizona Council (DAC)**
- **Arizona Broadband Map Portal and Community Planning Demographics/Tools**
- **GovNET/SACCCNet and Other BTOP Grants for Rural Network Infrastructure**
- **SB 1402 Enabling State Highway ROW Utilization for Fiber Deployment**
- **SB 1353 Telemedicine Parity Bill for Rural Telehealth Payment Enablement**
- **Strong Non-Profits in Telecom and Technology Community with Policy Influence**
- **Arizona's Growing Technology Industries, Especially A&D, Biotech & Cleantech**

There's a lot going on technically, in the marketplace, and across the regulatory landscape driving both increased broadband requirements, as well as available coverage and increases in speed, but remember, hope (alone) is not a strategy. And as the Rural Telecommunications Congress (RTC) principles open with, failing to plan is planning to fail.

For your communities and stakeholders in traditionally underserved rural areas to "keep up" or even exceed the averages for broadband availability and performance in the U.S., let alone the world, they must be an active and positive participant in encouraging broadband investment and optimizing its impact and use.

Community Planning Guidelines and Recommendations:

The Rural Telecommunications Congress (RTC) is a national membership organization dedicated to assuring that rural areas in the United States have access to the information and support they need to obtain and use advanced telecommunications services and technology for social and economic development. RTC has defined the following principles they consider to be the fundamental truths for effective community broadband planning. RTC believes that the application of these principles will result in much greater availability and benefits for broadband, higher performance, lower total costs, and higher overall return on investment.

- **Failing to plan is planning to fail.** Broadband is critical infrastructure for prosperity in the 21st century, and it should be planned accordingly.
- **The purpose is to improve economic opportunities and quality of life.** Broadband planning should focus first and foremost on these ends.
- **"Adequate" broadband is not adequate.** Broadband planning should result in abundant, reliable bandwidth and unfettered connectivity, and should make the most of technological change.
- **People and places are different, and each is important.** Broadband planning should accommodate differences between places by actively involving local community leaders, community members, providers, and other stakeholders in making decisions based on good data.
- **Leaders must be educated and engaged.** Broadband planning should engage private and public leaders at all levels. It should educate elected officials and other leaders about how and why broadband is critical, and should encourage them to become supporters and users.
- **Break down the silos.** Broadband should electronically connect all community domains and sectors (business, government services, education, public safety, etc.) to promote the exchange of information and tie community processes together
- **How it is used and who uses it is as important as what it is.** Broadband planning should be as concerned with adoption, applications, and processes, as with physical assets needed to build broadband networks.
- **Develop new ways of doing business.** Broadband planning should consider new business models and other innovations for developing, deploying, operating, and utilizing broadband, and should not assume that old models and practices are best.
- **Provide a catalyst for prosperity.** Broadband planning should foster development of and facilitate investments by users as well as providers, rather than just capitalizing on consumer demand for entertainment and passive recreation.

The above principles, developed and promoted by the RTC, are sound, well stated, and quite relevant to the Southeast Arizona broadband community planning processes and initiatives.

Before effective community planning can be achieved it is imperative to understand the current broadband capacity as compared to the targeted desired environment. A good starting point is for each community to conduct a gap analysis. Gap analysis is a frequently used tool that helps identify the gaps between a current situation and a future state that is a goal, along with the tasks needed to complete and close the gap.

Southeast Arizona is ideally situated to oversee local community-oriented or region-oriented gap analyses since it consists of local decision makers including elected officials, business leaders and community leaders. Southeast Arizona also plays a key role in helping to determine the buildout of state highways in its three-county region. This is ideal since the recent enactment of the Arizona Digital Highways bill (SB 1402) allows digital conduit to be built along Arizona's state highways.

Conducting a gap analysis will help a community or region to:

- Consider its current situation.
- Identify and review previous efforts, studies and output from area stakeholders.
- Determine its current digital capacity for broadband.
- Establish a target (i.e., analyze where it wants to be).
- Determine the capacity that is required to reach that target.
- Determine deficits (gaps) between its current digital capacity and the target,
- Suggest strategies and tactics that will get them to the target.

The gap analysis process requires significant levels of communication, collaboration and engagement to gather data about the current status of broadband services, including:

- Open forum style meetings for businesses to provide information about their uses of and needs for broadband.
- Meetings to gather input and support from municipal officials throughout the community or region.
- Public meetings with a target audience of citizens from the poorly served areas.
- An invitation to hundreds of area businesses to participate in an online survey regarding needs.
- Brief interviews with businesses located in business parks and a physical review of observable facilities in business parks.
- Additional phone call interviews with Southeast Arizona's largest businesses.
- A survey mailed to residents regarding service quality.
- A polling of the Internet Service Providers (ISPs) to request and obtain information about offerings, prices and coverage areas.

Community Planning Guide Outline:

The next step is to develop a plan for going forward, based upon the input received from the above process. Such a plan for expanding broadband services and improving Internet service to Southeast Arizona's citizens, businesses and government is represented below as a Community Planning Guide Outline.

1. Understand fundamental user requirements - these requirements are focused on four major application areas:
 - a. Economic development (jobs) and economic sustainability.
 - b. Education - expansion of distance learning, self-paced learning, and real-time testing and accountability.
 - c. Telehealth - using technology to lower costs, improve care, and enhance quality-of-life for rural residents.
 - d. Public Safety - delivery of real-time information and communication to ad-hoc groups of first responders as needed per event.
2. Obtain local stakeholder buy-in regarding
 - a. The nature of the problem regarding broadband capacity and the desired solution.

- b. The willingness to pay for and to work toward a common aggregated solution.
 - c. The cooperation of local government entities to facilitate shorter permitting times, standardized zoning practices, lower fees, rights-of-way (ROW) access and integration with other projects.
 - d. The identification of potential private sector partners and investors.
 - e. The willingness to augment private funding with grants, loans, etc.
 - f. The identification of “must have” and “nice to have” project goals.
3. Identify constraints and costs for providers to expand broadband capacity
- a. ROW and environmental requirements
 - b. Utility clearances as well as completion of environmental/cultural impact studies.
 - c. Potential areas of cooperation with providers from regions and local communities that can have significant positive impact on the return-on-investment (ROI) calculations to facilitate and encourage such investments by providers. For example, cities and towns control resources. They can emphasize fees and tax revenues, but they can choose to be more accommodating to potential and current providers, such as having low permitting and low or no use fees, giving ROW away or at least making it easy to utilize commercially.
4. Define community/provider project tasks
- a. Solidify community-wide demand aggregation with conditional pledges to purchase new capacity when available.
 - b. Determine property ownership and clearances if required for new construction
 - c. Obtain rights-of-way easements if and when required
 - d. Obtain environmental and cultural clearances if and when required
 - e. Advocate middle-mile infrastructure sharing among last-mile service providers
 - f. Find ways to Interface with and expand current infrastructure wherever possible
 - g. Identify and promote/require redundancy/interoperability solutions with middle-mile service providers.
5. Develop a project planning action plan:
- a. Create a problem and mission statement, a tactical plan (including financing options), a project budget(s), a process flow chart and timeline, draft provisional stakeholder term sheets reflecting commitments and success metrics.
 - b. Develop specific action-plans, identifying leaders, planners, broadband providers, technical consultants, including assignments and schedules (milestones), to meet the goals/objectives of identified projects.
 - c. Secure pledges of support from the stakeholders.
 - d. Communicate with potential investor/providers about desired projects to discover in detail the barriers that might prevent them from investing in an identified project.
 - e. Explore ways to mitigate possible barriers through partnerships and cooperative arrangements. Communities and stakeholders must distinguish the “Must Haves” from the “Like to Haves” in proposed projects in order to control costs and resources and to encourage investment.
6. Identify and agree upon major milestones and expected accomplishments. Determine how success will be measured.
- a. Leadership and Planning are essential for the success of any project.
 - b. Identify the leaders and advocates in each community for each project
 - c. Communicate with all leaders in the community and leaders in other communities frequently to learn about best practices and keep the project momentum high.
 - d. Track progress and take corrective actions that may be needed from time to time.

Understanding and Changing the Broadband Investor Equation:

A key element of the planning process is to initiate and maintain a dialogue between community stakeholder groups and broadband providers to grasp the salient issues and to strategize path(s) forward. One method to employ is to modify the investment equation to incentivize network providers to become engaged. Blair Levin developed a concept intended to drive and improve the “network investor equation.” Mr. Levin, who formerly served as Chief of Staff to FCC Chairman Reed Hundt in the 1990s, is currently the Executive Director of Gig.U, an organization that seeks to accelerate the deployment of ultra-high-speed networks to leading U.S. universities and their surrounding communities. Mr. Levin’s formula shown below is intended to show how digital providers and policy makers can influence the factors involved in creating a positive return on investment in areas where providing digital connectivity can be challenging, such as in the Southeast Arizona communities and rural Arizona in general. By using the strategy of demand aggregation in areas of need it becomes feasible to alter the network investor equation.

Reducing ROW costs and time to market leads to a lowering of capital expenditures (Cap Ex). Co-location of towers reduces capital expenditure requirements for digital providers. Aggregating demand through anchor tenants as digital customers increases digital provider revenues. Further recommendations below positively impact this formula for digital providers.

The Broadband Network Investor Equation

Costs

Benefits

$$C + O > (1-r)R + SB + (-CL)$$

Changing the Broadband Network Investor Math



$$C + O < (1-r)R + SB + (-CL)$$



Network Investor Equation Definitions:

C - Capital Expenditures

O - Operating Expenditures

r - Risk

R- Revenues

SB- System Benefits (Benefits that drive increased revenues outside the communities where the new or incremental investments are made.)

CL- Losses due to competition

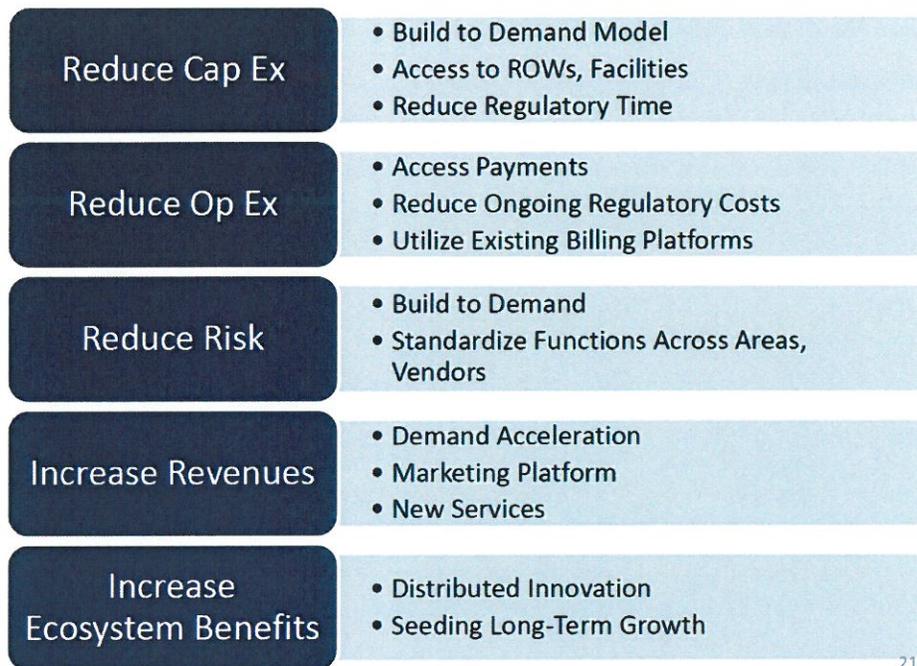
Source: Blair Levin, Executive Director, Gig.U & former Director of the FCC National Broadband Plan (Levin, How Community Efforts Can Change the Math, 2012)

Southeast Arizona Broadband Business Case Analysis (V01G)

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By communicating with providers, users and local government entities communities can do a great deal to facilitate a change in the math that determines network investment. Capital expenditure can be reduced by focusing on what is needed by potential users, providing cost effective access to ROW and reducing the time to get regulatory approvals. Operating expenses can be minimized by focusing on access payments, bringing down the fees for ongoing regulation and wherever possible using billing mechanisms that are already in place. Risk can be mitigated by building only what is needed and standardizing as many functions as possible across regions and vendors. The above actions will lead to an acceleration of demand allowing for the development of marketing platforms and new services. The overall benefits will be the distribution of innovative solutions and long-term growth and sustainability. See the chart below for a representation of this process.

How Community Efforts Can Change the Math



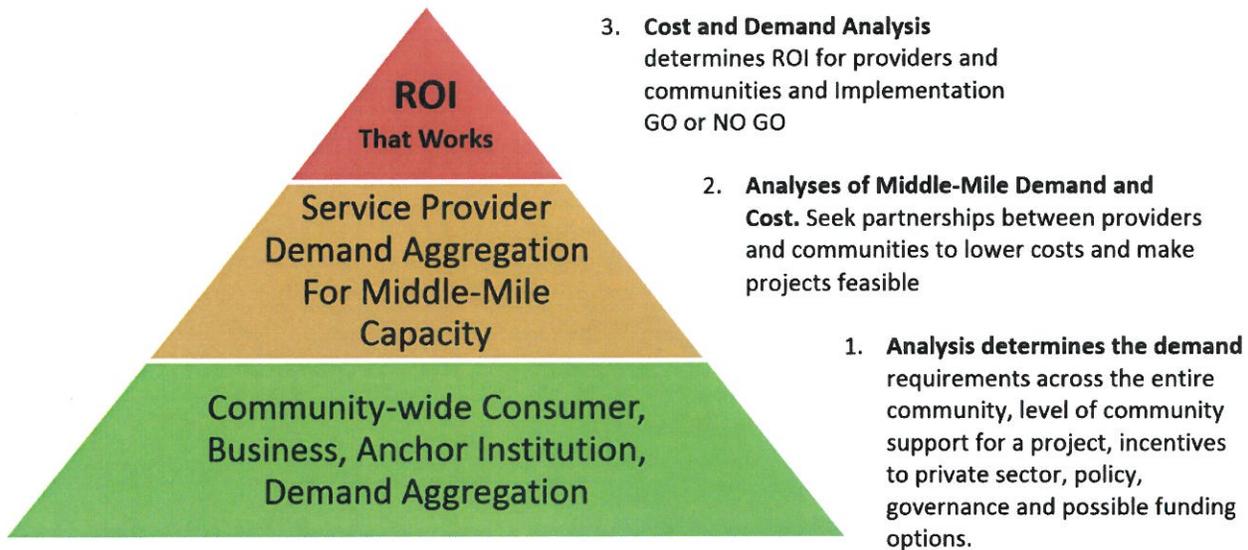
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Source: Blair Levin, Executive Director, Gig.U & former Director of the FCC National Broadband Plan (Levin, How Community Efforts Can Change the Math, 2012)

Demand Aggregation:

To improve the likelihood of expanded broadband investment being made in a particular community or region an analysis for demand aggregation potential should be undertaken. Identification and quantification of increased potential demand along with identified ways to lower (or offset) planning and construction costs are necessary ingredients for incentivizing the private sector to make investments they might otherwise not be prepared to make. An important issue to examine is how to combine multiple existing single network connections into a larger pool of connections that can share the resources of an expanded infrastructure.

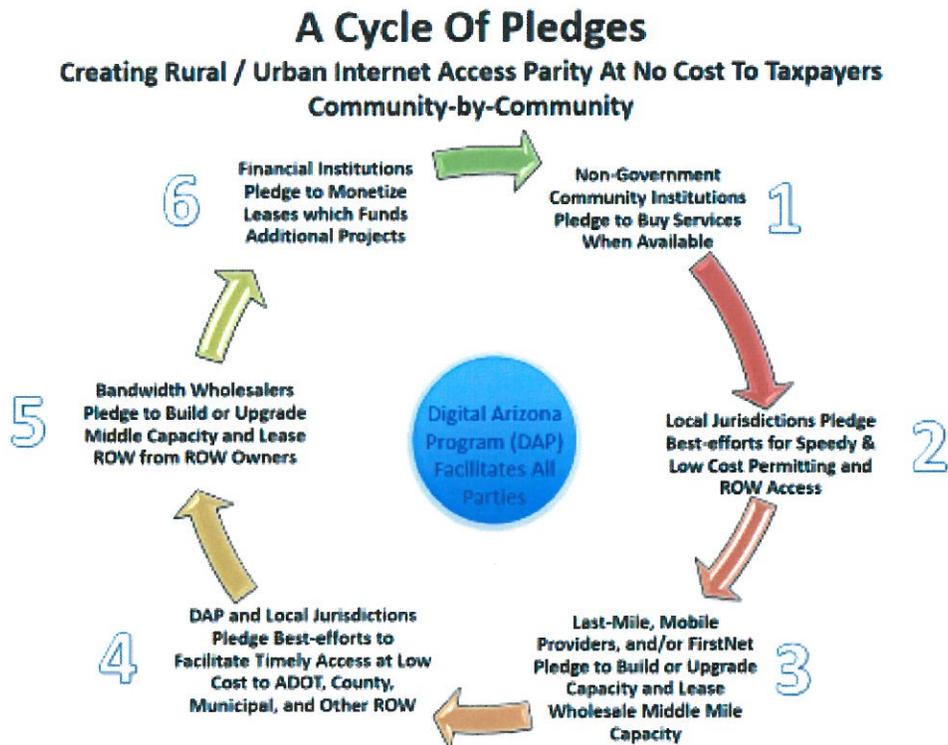
Community Demand Aggregation means the inclusion of stakeholders (business, government, anchor institutions and residents) to quantify a greater demand for broadband services. Communities can obtain binding pledges from Community Anchor Institutions (CAIs) to purchase improved broadband services conditional on their availability on pre-determined terms. Communities may also look for funding streams to offset a portion of the costs that would normally be borne by private investors.



Service provider aggregation means sharing capacity among providers (especially middle-mile capacity). Design and construction costs can be lowered with alternate funding streams including revolving loans, Community Reinvestment Act (CRA) initiatives, USDA Broadband projects and making community physical assets and ROW available at or near cost.

Pledges of Support:

An innovative method for leveling the playing field, creating Internet access parity between rural and urban communities, and benefiting the private sector providers involves securing pledges of support from the various stakeholders. This can be accomplished at the community level at no additional cost to taxpayers and is illustrated below as a cycle of pledges. The stakeholders in this process include the community institutional users, local government entities, broadband providers, Arizona state government agencies, banks and investment institutions, and end users.



An enhanced ROI model for the provider(s) and a community's commitments will help to ensure success and sustainability of any new broadband infrastructure investments. And securing pledges of support as commitments to use newly available broadband services can go a long way in favorably shifting potential providers' calculation of investment risk and ROI.

Some Practical Options:

Below are some practical short-term options available to Southeast Arizona that could lead to a substantial improvement in broadband access.

Educate and coach the Southeast Arizona counties and communities to help businesses and residences by providing information to the public about existing options. Such actions include holding public informational meetings and distributing reports such as this one. Southeast Arizona should also publish selected portions of such reports, with maps and tables, on its website. Another viable option is to prepare a concise "brochure" for residents about broadband and distributing it within mailings required for other purposes.

Encourage counties and communities that own or have access to towers and water towers for public safety purposes to identify those towers that are open for use by commercial entities. They could then maximize providers' coverage and bandwidth by offering space on available towers to wireless providers at affordable prices to encourage expansion of their coverage areas.

Strive to expand broadband coverage by meeting with current and prospective providers to review the coverage maps contained in the "Southeast Arizona Broadband Technical Report" showing known poor or non-existent coverage areas. The Arizona Community Planning Broadband Map at <http://broadbandmap.az.gov/CommunityPlanningMap/> contains a good deal of additional relevant information. Then encourage those providers to specifically target those areas for expanded coverage. One avenue for expanding coverage might include working with providers to apply for grants and loans to improve middle mile bandwidth. See the "DAP Broadband Grants & Resources Guide" for more details. Urge residents to use the speed tests found at http://www.digitalarizona.gov/Maps/Arizona_Broadband_Maps.html so that Southeast Arizona can gain a better understanding of what levels of broadband service is available in the three counties.

Enhance public access to the Internet via active support of library, school and non-profit entities that plan to improve access to broadband or to provide computers for disadvantaged residents. Examples of such supportive actions include providing meeting rooms for training classes; establishing a volunteer service program in which participants assist with training classes and in setting up computers; supporting community-led initiatives to train and educate members of the community on how to use broadband and the Internet effectively; and encouraging local businesses to donate computers and to volunteer their services to support sustainable broadband adoption.

Identify grant and loan projects by collaborating with public-service entities, including neighboring counties, technical colleges, healthcare organizations and K-12 school districts. Each of these entities has valid reasons to promote more available and affordable broadband services and each has resources or assets to bring to the table. Healthcare organizations have qualified staff that could conduct remote "house calls" for homebound patients; but this requires reliable, high capacity broadband connectivity to the home. K-12 districts want to ensure that students have quality Internet access at home as more and more course material is now available only online. Those districts have land and buildings that could be used to

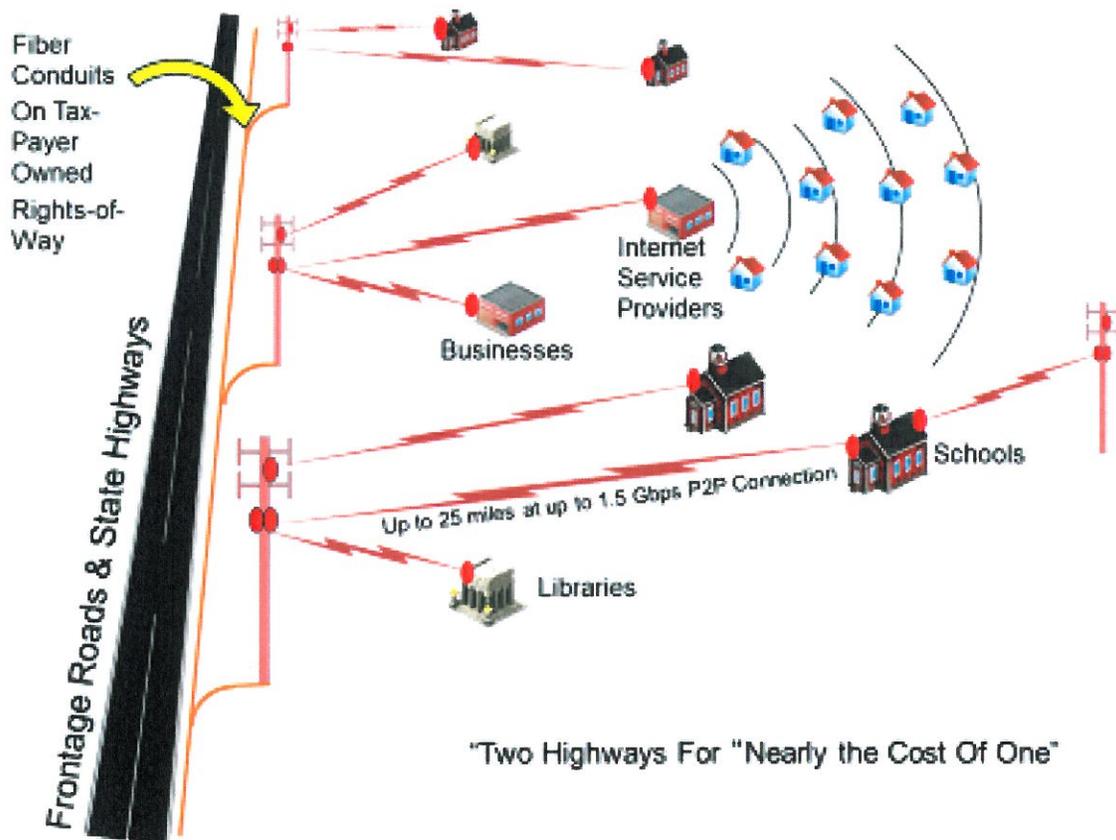
host network equipment sites.

Explore the possibility of partnering with local incumbent phone companies. Many residents in rural areas are served by a variety of smaller carriers. These companies are often constrained by the availability of capital to expand or upgrade their systems especially in this tight capital market. There may be opportunities for Southeast Arizona to partner with these smaller providers with regard to grant opportunities. If opportunities to partner with these companies do exist, then Southeast Arizona has the potential to significantly upgrade the service offerings by deploying government or shared assets for them to use in these rural areas.

Investments must be made in the Southeast Arizona region by the private sector and communities to improve broadband functions and features. Communities should explore various funding opportunities available only to governments and non-profit organizations to augment private sector investment. Internet accessibility is critical for businesses, schools, telemedicine and public safety. Businesses must be able to reduce operating costs by deploying efficient systems through exploiting the power of the Internet including shipping/receiving logistics, purchasing power and customer service. These companies rely upon high capacity broadband to service their customers and efficiently run their businesses.

An example of a tactical model being considered in Arizona where middle mile fiber deployed in highway ROW feeds towers from which mobile and fixed wireless broadband can be distributed to nearby communities and populations is shown below.

Digital Arizona Tactical Model Illustration



Source: Arizona Strategic Enterprise Technology Office (ASET)

Southeast Arizona Broadband Business Case Analysis Process:

A portion of the State's five year NTIA Broadband Grant is targeted to supporting Community Broadband Planning and Technical Assistance in Arizona's rural areas. ASET in partnership with the Arizona Telecom & Information Institute (ATI Institute) is working with Southeast Arizona to establish and coordinate broadband-related programs, as well as provide consultants and support for several important actions to build the organizational capacity needed to support the development and implementation of the Business Case Analysis (BCA).

- The Southeast Arizona Broadband Steering Committee was formed with broad participation among regional economic development, educational technology, transportation, government IT, healthcare, and public safety stakeholders.
- The Southeast Arizona Broadband Steering Committee had significantly facilitated dialogue regarding regional broadband gaps and issues, as well as potential strategies and tactics to ensure that the region has adequate bandwidth.
- The creation of Southeast Arizona web content on the Cochise County site (http://www.cochise.az.gov/cochise_facilities.aspx?id=12402) to communicate to the community and stakeholders about broadband activities across the region to foster community engagement.
- The identification of potential grants that could be applied for and contributions to a **DAP Broadband Grants & Resources Guide** to support increased availability and/or more effective use of broadband connectivity in local communities.
- The development of community profiles with a wealth of economic and broadband information and resources in spreadsheet form for use on the State map portal.

Under the same grant, the consultants are also providing regional Broadband Technical Assistance including:

- Gap analysis including Broadband Services Availability and Broadband Infrastructure Availability
- Detail broadband applications and their applicability to Regional Rural Broadband Related Job Opportunities



ASET's Broadband Deployment Process

Outreach

Development Consultants

Informing
ASET, ATII, ATIC will inform COGs' Regions/Communities of the Broadband mission in AZ (ASET will provide details/budget)

Discussions
Listen to region/community problems and document—leading to requests for assistance To ASET

Consultants Engaged
Facts gathered will define the problem(s) & ATII's Tech-Assist. Professionals will provide a GAP Analysis

Technical Assistance Consultants

From the GAP Analysis documentation will be prepared that will define whether existing infrastructures and/or services are:

- 1) Sufficient
- 2) Insufficient
- 3) And if insufficient, what are the possibilities for needed improvements

Prepare Implementation Strategy
Working with:
COGs/ADOT, Community Leaders/Businesses
Service Providers
ATII Technical Assistance Consultants

The first step was for Systems Technology Staffing consultants to engage Southeast Arizona's county leadership and the ASET/ATII project management consultant. This was accomplished by meetings and correspondence with the core team and obtaining consensus and endorsement for plans regarding the Broadband Steering Committee's goals, formation, logistics, and membership. The next step involved presentations to the Southeast Arizona Executive Committee and getting their buy-in. This was followed by outreach and engagement of potential Broadband Steering Committee members and their other recommendations for participation.

A series of maps and an inventory of available broadband providers and services and infrastructure was produced utilizing a variety of resources including the biannual broadband provider data sets collected by ASET and available through the Digital Arizona Broadband Community Planning Map as well as the use of other analytic and GIS processing. Sixteen communities within the four Southeast Arizona counties were further analyzed, including available broadband providers and their reported service speeds based on data from the map.

This was combined with a variety of demographic data from U.S. Census data, a number of State of Arizona agencies, the Arizona Commerce Authority, city-data.com, and other statistical sources. Initial inputs were gathered from community members, businesses, local governments, and community anchor institutions which when further refined in the future will become the ingredients for potential broadband demand aggregation. Benchmark broadband speed test results for the region were collected and analyzed, to be augmented by additional testing capabilities coming online going forward. Further, State and regional transportation departments augmented by broadband map analysis identified routes and locations where infrastructure assets are currently available and where there are needs and opportunities to increase digital capacity. All this information can provide fundamental guidance in the process of planning for where to focus on increased capacity and service needs.

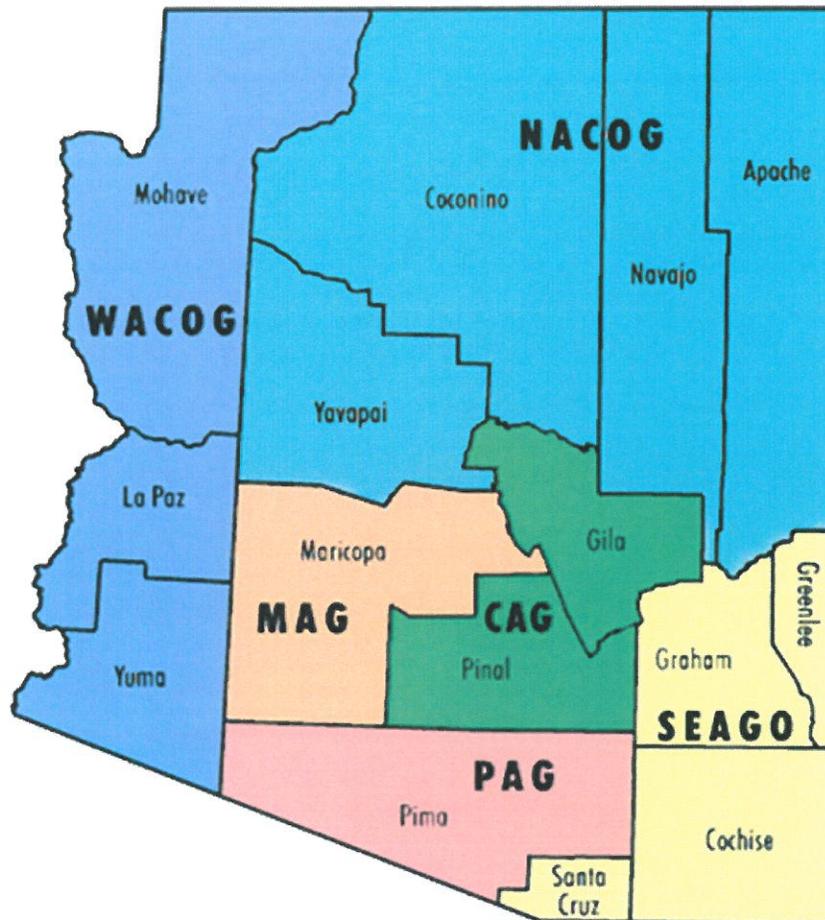
By determining not only the current availability of digital services within the three counties and creation of a composite picture of each community's demographic and socio-economic makeup, the Southeast Arizona Broadband Steering Committee will be able to generate the rationale for why and where additional digital capacity and services are most needed within the various Southeast Arizona sub-regions and localities, as well as develop location and situation appropriate strategies and tactic.

Thus this Southeast Arizona Broadband Business Case Analysis (BCA) has been prepared stressing community planning analysis, guidelines, and recommendations. The foundation of the document uses the inventory described above for current broadband services to identify current digital capacity capabilities and limitations. It presents what is required by the stakeholders and regional/community leaders to enhance and upgrade competitive infrastructure to support economic development/jobs, education, telemedicine, and public safety. Broadband infrastructure deployment projects and private sector partnerships and private sector solicitations will be based upon demand analysis and sometimes identified urgencies. Southeast Arizona communities will continue to focus on the benefits of broadband and how it can further enhance the region's economic vitality and quality of life.

Southeast Arizona County Overviews and Broadband Gap Analysis:

Southeast Arizona Region Overview:

Arizona's Rural and Urban Councils of Government (COGs)



The **Southeast Arizona** region consists of Cochise, Graham, Greenlee, and Santa Cruz Counties who provide a wide variety of services within their boundaries. The four counties are all participating in this broadband analysis and planning process with Cochise County leading the procurement and management of the broadband consultant services. All four counties are also members of the South Eastern Arizona Governments Organization (SEAGO - <http://www.seago.org/>), a regional planning agency. These four counties consist of a total of 13,868 square miles representing 12.2% of the State with 225,389 residents representing just 10.1% of the State's population (2012 estimate).

The other three rural COGs are Northern Arizona Council of Governments (NACOG) covering Coconino, Apache, Navajo, and Yavapai counties, Central Association of Governments (CAG) covering Pinal and Gila counties, and the Western Arizona Council of Governments (WACOG) covering La Paz, Mohave, and Yuma counties. The two primarily urban COGs are the Maricopa Association of Governments (MAG) and the Pima Association of Governments (PAG), neither of which are considered rural.

Within the Southeast Arizona region, each county and community has different demographic profiles, workforce characteristics, broadband gaps, and opportunities to focus on regarding

achieving additional broadband capacity and utilization. A brief summary of each counties' unique profile and challenges follows.

Southeast Arizona Broadband Gap Analysis Overview:

To recognize where Southeast Arizona needs to place emphasis on broadband capacity development, it was necessary to first determine what is currently available within Southeast Arizona's territory and perform a gap analysis. Southeast Arizona four counties cover the southeaster corner of Arizona consisting of a total of 13,868 square miles with a population of 225,389 (2012 estimate). Investigative research focused on demands for economic development, education, telemedicine, and public safety stakeholders within each region/community, in which it was discovered that the Southeast Arizona region has significant gaps in broadband availability, coverage, provider diversity, and performance. The region most definitely requires additional and enhanced broadband service offerings to be able to attract and sustain economic development programs (jobs, education/skill-sets), as well as meet regional educational, medical, and public safety services needs today and increasingly for its future. Several current data resources were utilized to determine the existing digital capabilities for the area and major population centers.

The purpose of the Arizona Broadband Assessment Project (AZ BAP) is to identify both the availability and speed of broadband services, and the location of broadband infrastructure throughout Arizona, including middle mile infrastructure and Community Anchor Institutions (CAIs). This project is provided through the American Recovery and Reinvestment Act of 2009 (ARRA) and the Broadband Data Improvement Act (BDIA), and in conjunction with the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC). AZ BAP is managed by the Arizona Strategic Enterprise Technology Office (ASET) under the Arizona Department of Administration (ADOA) in partnership with the Arizona State Land Department (ASLD), contractor Data Site Consortium, Inc. and their GIS subcontractor, TerraSystems Southwest (TSSW).

AZ BAP has been collecting detailed broadband coverage and speed data from Arizona's broadband providers since 2010 and the latest data set for Spring 2013 is current as of December 31, 2012. Arizona State Land Department (ASLD) maintains the related Arizona Broadband Map at <http://broadbandmap.az.gov/map/> loaded with the last broadband data set. There is also a special Community Planning version of the broadband map available at <http://broadbandmap.az.gov/CommunityPlanningMap/>, loaded with demographic data and special analysis tools that will aid community broadband analysis and planning. These tools are designed to mutually serve both Arizona's broadband consumer helping lead them to broadband providers' offerings thus useful for the provider community in marketing and outreach, as well as to contribute to State and regional policy and strategic planning.

A variety of broadband speed test data is available to inform our State and regional analysis. The federal Consumer Broadband Test (<http://www.broadband.gov/qualitytest/about/>) results are regularly downloaded by AZ BAP and processed to help verify broadband providers' declared coverage. Arizona has recently launched its own speed test (<http://www.digitalarizona.gov/Survey/StandardInArizonaQuestion.html>) and results will be added to our analysis capabilities over time. Speed tests by speedmatters.org (<http://www.speedmatters.org/>) are readily accessible, but the quantity of tests performed to date does not yet rise to the level of statistical significance and may prove somewhat dated. Early results point to the fact that all the three counties are below or just nearly at the minimum FCC benchmark, (4 Mbps Down and 1 Mbps Up) and nowhere near the Educationally Sufficient benchmark of 6 Mbps (up and down) established by the State Superintendent of Education. County-by-county demographics and analysis follows and county-level employment estimates breakdown and detailed broadband availability statistics by technology type can be found in Appendix C. More detailed broadband and infrastructure maps may be found in the complimentary **SE Arizona Broadband Technical Report**.

Cochise County Overview and Broadband Gap Analysis:

Population: 132,088
 Labor Force: 61,332
 Land: 6,166 sq. miles

Major Industries:	Industry	Establishments	Total Sales
	Retail Sales	1,308	\$ 1,343,104,000 1
	Prof/Sci/Tech	940	\$ 669,293,000 2
	Health Care & SocAssist	897	\$ 392,885,000 3
	Admin&Support &Waste Mng.	642	\$ 118,175,000 4
	Real Estate & Rental/Lease	848	\$ 102,030,000 5
	Other	1,314	\$ 71,628,000 6
	Education	214	\$ 6,491,000 7
	Information	110	N/A

Law enforcement workers including supervisors (14%)- the largest of the occupations in Cochise County. Demand on Public Safety is essential for border patrol and international trade. Cochise County includes three points-of-entry from Mexico (Aqua Prieta, Naco and Nogales).

Cochise County Strategic Plan 2011 - 2015

- Expand and integrate information and technology systems
- Expand jail and evidence storage
- Expand use of technology systems
- Limit liabilities to county
- Maintain professional legal services
- Maintain fair and effective court services
- Ensure offenders are sanctioned appropriately

USDA will continue with broadband, and now look for food/farmer's market projects.

Sector Strategy - 2013 Arizona Sector Partnership:

- Cochise, Graham, Greenlee Counties Region:
 - Utilities Certificate Partnership. Status: Active. Exploring: Mining
- Pima, Cochise, Graham, Greenlee, Santa Cruz and Yuma Counties:
 - Southern Arizona Logistics Education Organization (SALEO). Status: Active.
 - Exploring: Border Security
- Update the most used Cochise County Web site. There is too much old data.

This is an opportunity for Cochise to add objectives.

POSSIBLE TEST SITES FOR UNMANNED PLANES



Source: FAA Unmanned Aircraft Systems Office

THE REPUBLIC

Arizona Sites include: 1) Yuma (Rolle field), 2) Prescott (Embry-Riddle Aeronautical University would be a hub for unmanned testing in Prescott), 3) Benson & 4) Safford (Benson and Safford would be center of testing for southeastern Arizona).

Cochise County broadband application rankings (highest to lowest priority):

1. Economic Development
2. Telemedicine
3. Public Safety
4. Education

Overall ranking of the four counties:

1. Economic Development
2. Telemedicine
3. Public Safety
4. Education

	<u>Population</u>
Cochise County	130,752
Bisbee (County Seat)	5,466
Benson	5,071
Douglas	16,673
Huachuca City	1,816
Sierra Vista	45,794
Tombstone	1,350
Wilcox	3,674
Unincorporated	50,908

For additional Cochise County information see:

- Cochise County - <http://www.cochise.az.gov/http://www.co.yuma.az.us/>
- Cochise County Economic Development & Chamber of Commerce Links - http://www.cochise.az.gov/cochise_economic_development.aspx?id=1584&ekmense=c580fa7b_328_0_1584_1http://www.greateryuma.org/
- Cochise County Wikipedia Entry - http://en.wikipedia.org/wiki/Cochise_County,_Arizona

Cochise County Broadband Gap Analysis:

- There is limited DSL coverage in Cochise County with 81.0% of the population able to get DSL at ≥ 768 Kbps downstream but only a slim 38.9% can get ≥ 6 Mbps. All population centers have some DSL coverage, but far from complete and there is additional coverage in the center and west side of the county.
- There is also limited cable modem coverage in Cochise County with only 71.5% of the population having available service, though consistently at speeds ≥ 10 Mbps. All population centers except Wilcox have some cable modem coverage, but far from complete and there is virtually no coverage outside these areas.
- Fixed wireless (licensed and unlicensed) has a more extensive footprint estimated to reach 99.4% of the Cochise County population with ≥ 768 Kbps downstream, but only 57.8% can get ≥ 6 Mbps. However, much of the Sierra Vista area can get ≥ 6 Mbps coverage.
- Mobile wireless in Cochise County has a similarly broad footprint to fixed wireless, estimated to reach 99.9% of the population at speeds ≥ 768 Kbps and 79.4% at speeds ≥ 6 Mbps. Higher speed services are centered around the Benson, Douglas, and Sierra Vista areas.
- A limited number of Middle Mile points, almost always fiber fed, are available primarily from AZNet, CoxCom, CenturyLink, Level3 Communications, Valley Telecom Group, and Zayo.
- SpeedMatters.org reports in Cochise County:

Cochise County	Mbps	Mbps
Zip Code	Tests	Download Upload
85602	9	3.1 1.0
85643	6	1.6 0.5
85606	1	0.5 0.1
85630	4	1.2 0.5
85625	2	6.1 1.1
85310	10	1.2 0.4
85638	1	0.4 0.3
85616	1	3.6 0.5
85607	2	1.3 1.0
85617	3	0.7 0.3
85613	3	5.4 1.1
85650	8	5.7 1.8
85615	4	2.3 1.7
85603	8	3.0 0.4
85607	2	1.3 1.0
85635	17	6.8 1.5

The next round of Cochise County broadband community planning and technical assistance activities could focus on:

- Foreign Trade Zone (FTZ), expansion with sub-zones
- Attract new business to offset employment losses at Fort Huachuca
- Attract intermodal operation along I-10 and UPRR line
- UAV federal proposal - Benson and Safford
- Public Safety - border, international trade

Cochise County Selected Demographics

Baseline Demographics	Cochise County	State of Arizona
County seat/State capitol	Bisbee	Phoenix
Land area in square miles	6,165.69	113,594.08
Population, 2012 estimate	132,088	6,553,255
Population, percent change, 4/1/10-7/1/12	.6%	2.5%
Persons under 18 years, percent, 2012	22.4%	24.7%
Persons 65 years and over, percent, 2012	18.1%	14.8%
Persons per household, 2007-2011	2.53	2.64
Persons per square mile, 2010	21.3	56.3
High school graduate or higher, percent of persons age 25+, 2007-2011	85.0%	85.2%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	21.9%	26.4%
Per capita income in the past 12 months (2011 dollars), 2007-2011	\$ 23,296	\$25,784
Median household income, 2007-2011	\$ 45,906	\$50,752
Persons below poverty level, percent, 2007-2011	16.2%	16.2%
Homeownership rate, 2007-2011	69.2%	66.6%
Total civilian labor force, 7/13	58,483	3,017,815
Total employment, 7/13	53,474	2,766,640
Total unemployment, 7/13	5,009	251,175
Unemployment rate, 7/13	8.6%	8.3%

Employment by Category (July 2013 Estimates)	Cochise County by Population	Statewide by Population	Cochise County %	Statewide %
Total Nonfarm Establishments	35,575	2,453,900	100.0%	100.0%
Total Private Nonfarm Employment	24,200	2,088,300	68.0%	85.1%
Goods Producing	1,975	296,200	5.6%	12.1%
Mining and Construction	1,300	139,400	3.7%	5.7%
Manufacturing	675	156,800	1.9%	6.4%
Service-Providing	33,600	2,157,700	94.4%	87.9%
Private Service-Providing	22,225	1,792,100	62.5%	73.0%
Trade, Transportation & Utilities	6,125	482,600	17.2%	19.7%
Information	425	39,600	1.2%	1.6%
Financial Activities	1,025	183,200	2.9%	7.5%
Professional & Business Services	4,600	360,500	12.9%	14.7%
Educational & Health Services	5,275	369,700	14.8%	15.1%
Leisure and Hospitality	3,800	272,100	10.7%	11.1%
Other Services	975	84,400	2.7%	3.4%
Government	11,375	365,600	32.0%	14.9%
Federal Government	5,475	55,700	15.4%	2.3%
State & Local Government	5,900	309,900	16.6%	12.6%

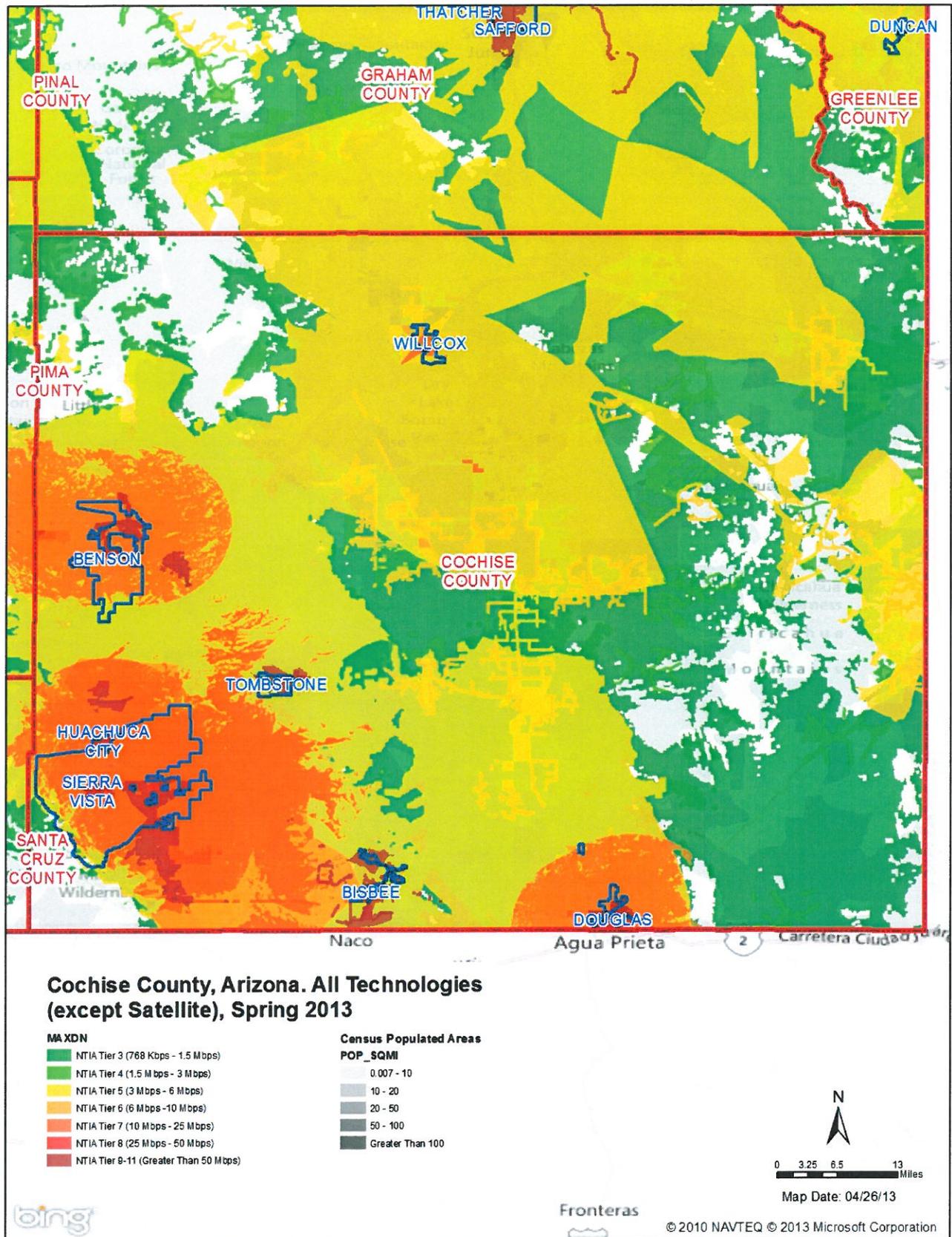
Sources: U.S. Census Bureau State & County QuickFacts (<http://quickfacts.census.gov/>) and ADOA Office of Employment & Population Statistics (<http://www.workforce.az.gov/>). For employment by category estimates, farm employment, private household employment, and self-employment are excluded and all employment statistics are non-seasonally adjusted.

Cochise County Broadband Coverage for Spring 2013

All Broadband Tech (Except Satellite)	Cochise County		State of Arizona	
	Population	Household	Population	Household
≥ 768 Kbps Down	99.9%	99.8%	99.5%	99.5%
≥ 3 Mbps Down	99.8%	99.5%	97.8%	97.5%
≥ 6 Mbps Down	90.8%	88.1%	95.6%	95.2%
≥ 10 Mbps Down	87.9%	84.9%	95.1%	94.6%
DSL, xDSL & Other Copper Tech	Population	Household	Population	Household
≥ 768 Kbps Down	81.0%	81.9%	93.1%	92.8%
≥ 3 Mbps Down	57.5%	58.7%	87.2%	86.4%
≥ 6 Mbps Down	38.9%	39.1%	79.9%	78.4%
≥ 10 Mbps Down	28.9%	28.1%	70.1%	68.4%
Cable Modem Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	71.5%	71.1%	89.3%	88.7%
≥ 3 Mbps Down	71.5%	71.1%	89.3%	88.7%
≥ 6 Mbps Down	71.5%	71.1%	89.2%	88.6%
≥ 10 Mbps Down	71.5%	71.1%	89.2%	88.6%
Fixed Wireless Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	99.4%	99.1%	94.7%	94.5%
≥ 3 Mbps Down	99.4%	99.1%	62.0%	62.9%
≥ 6 Mbps Down	57.8%	56.9%	34.8%	34.9%
≥ 10 Mbps Down	3.7%	4.6%	5.4%	5.4%
Mobile Wireless Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	99.9%	99.7%	98.7%	98.9%
≥ 3 Mbps Down	89.1%	86.5%	92.8%	91.5%
≥ 6 Mbps Down	79.4%	74.7%	87.0%	85.3%
≥ 10 Mbps Down	79.3%	74.7%	86.9%	85.2%
	Population Count	Household Count	Population Count	Household Count
Totals (2010 Census)	131,346	59,041	6,392,017	2,844,526

Notes: Data presented in table above is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12. Population across Census Blocks and in proximity to Road Segments are based on calculations utilizing U.S. Census 2010 data.

See also the complementary **Southeast Arizona Broadband Technical Report** in Appendix B for additional Cochise County broadband maps by each technology type, detailed views of the Bisbee and Douglas areas, and a table of the 23 broadband providers known to be active in the county including their technology type(s) and speed range(s).



Note: More detailed broadband and infrastructure maps for Cochise County by individual technology type and for the Bisbee and Douglas area, may be found in the complimentary

Graham County Overview and Broadband Gap Analysis:

Population: 37,416
 Labor Force: 14,532
 Land: 4,623 sq. miles

Major Industries:	Industry	Establishments	Total Sales
	Retail Sales	253	\$ 393,529,000 1
	Health Care & SocAssist	307	\$ 108,382,000 2
	Other	234	\$ 35,162,000 3
	Prof/Sci/Tech	142	\$ 13,163,000 4
	Education	51	\$ 998,000 5
	Information	32	N/A
	Real Estate & Rental/Lease	139	N/A
	Admin&Support &Waste Mng.	130	N/A

- USDA will continue with broadband, and now look for food/farmer's market projects.
- Update the most used Graham County Web site. There is too much old data.
- This is an opportunity for Graham to add objectives.

Graham County broadband application rankings (highest to lowest priority):

1. Economic Development
2. Telemedicine
3. Education
4. Public Safety

Overall ranking of the four counties:

1. Economic Development
2. Telemedicine
3. Public Safety
4. Education

	Population
Graham County	37,314
Safford (County Seat)	9,653
Pima	2,418
Thatcher	4,983
Unincorporated	20,260

For additional Graham County information see:

- Graham County - <http://www.graham.az.gov/>
- Graham County Chamber of Commerce - <http://www.graham-chamber.com/>
- Graham County Wikipedia Entry - http://en.wikipedia.org/wiki/Graham_County,_Arizona

Graham County Broadband Gap Analysis:

- There is very limited DSL coverage in Graham County only 54.4% of the population able to get DSL at ≥ 768 Kbps downstream but a very slim 20.5% can get ≥ 6 Mbps. All population centers have some DSL coverage, but far from complete and there is additional coverage in the southwest portion of the county.
- There is somewhat better cable modem coverage in Graham County with 77.4% of the population having available service, consistently at speeds ≥ 10 Mbps. All population centers have significant cable modem coverage with some peripheral areas unserved and there is no coverage available outside these population centers.
- Fixed wireless (licensed and unlicensed) has a more extensive footprint estimated to reach 83.9% of the Graham County population with ≥ 3 Mbps downstream including all population centers, but there is no available service ≥ 6 Mbps anywhere in the county.
- Mobile wireless in Graham County has a ubiquitous footprint estimated to reach 99.9% of the population at speeds ≥ 768 Kbps. However, there are virtually no fourth generation (4G) services with speeds ≥ 3 Mbps downstream available, currently limited to 2.0% of the population and no services anywhere in the county at ≥ 6 Mbps.
- A very small number of Middle Mile points, almost always fiber fed, are available from CenturyLink, Level3 Communications, and Valley Telecom Group.
- There is one area of Graham County that is an exception. Safford and Thatcher has benefited from decade-long Broadband focus of John Lucas, Graham County CIO under Terry Cooper's support and leadership. Together, along with a multitude of vendors, Safford is now served by fiber with additional fiber plant serving much of the twin cities. This focus and process is the gold standard for developing better Internet in rural Arizona.
- SpeedMatters.org reports in Graham County:

Graham County		Mbps	Mbps
Zip Code	Tests	Download	Upload
85643	6	1.5	0.5
85552	1	0.2	0.2
85546	2	4.3	0.5

The next round of Graham County broadband community planning and technical assistance activities could focus on:

- Business Retention and Expansion
- Youth and skilled worker Retention
- Leader in rural broadband with SACNET, good business model. Resources to support.

Graham County Selected Demographics

Baseline Demographics	Graham County	State of Arizona
County seat/State capitol	Safford	Phoenix
Land area in square miles	4,622.60	113,594.08
Population, 2012 estimate	37,416	6,553,255
Population, percent change, 4/1/10-7/1/12	.5%	2.5%
Persons under 18 years, percent, 2012	27.8%	24.7%
Persons 65 years and over, percent, 2012	11.9%	14.8%
Persons per household, 2007-2011	2.96	2.64
Persons per square mile, 2010	8.1	56.3
High school graduate or higher, percent of persons age 25+, 2007-2011	82.6%	85.2%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	14.4%	26.4%
Per capita income in the past 12 months (2011 dollars), 2007-2011	\$ 16,116	\$25,784
Median household income, 2007-2011	\$ 43,083	\$50,752
Persons below poverty level, percent, 2007-2011	21.6%	16.2%
Homeownership rate, 2007-2011	74.2%	66.6%
Total civilian labor force, 7/13	14,494	3,017,815
Total employment, 7/13	13,294	2,766,640
Total unemployment, 7/13	1,200	251,175
Unemployment rate, 7/13	8.3%	8.3%

Employment by Category (July 2013 Estimates)	Graham County by Population	Statewide by Population	Graham County %	Statewide %
Total Nonfarm	8,575	2,453,900	100.0%	100.0%
Total Private Employment	5,875	2,088,300	68.5%	85.1%
Goods Producing	1,425	296,200	16.6%	12.1%
Mining and Construction	-	139,400	-	5.7%
Manufacturing	-	156,800	-	6.4%
Service-Providing	7,150	2,157,700	83.4%	87.9%
Private Service-Providing	4,450	1,792,100	51.9%	73.0%
Trade, Transportation & Utilities	1,550	482,600	18.1%	19.7%
Information	-	39,600	-	1.6%
Financial Activities	-	183,200	-	7.5%
Professional & Business Services	-	360,500	-	14.7%
Educational & Health Services	-	369,700	-	15.1%
Leisure and Hospitality	-	272,100	-	11.1%
Other Private Services	2,900	84,400	33.8%	3.4%
Government	2,700	365,600	31.5%	14.9%
Federal Government	425	55,700	5.0%	2.3%
State & Local Government	2,275	309,900	26.5%	12.6%

Sources: U.S. Census Bureau State & County QuickFacts (<http://quickfacts.census.gov/>) and ADOA Office of Employment & Population Statistics (<http://www.workforce.az.gov/>). For employment by category estimates, farm employment, private household employment, and self-employment are excluded and all employment statistics are non-seasonally adjusted.

Graham County Broadband Coverage for Spring 2013

All Broadband Tech (Except Satellite)	Graham County		State of Arizona	
	Population	Household	Population	Household
≥ 768 Kbps Down	99.9%	99.8%	99.5%	99.5%
≥ 3 Mbps Down	95.7%	97.4%	97.8%	97.5%
≥ 6 Mbps Down	77.4%	80.8%	95.6%	95.2%
≥ 10 Mbps Down	77.4%	80.8%	95.1%	94.6%
DSL, xDSL & Other Copper Tech	Population	Household	Population	Household
≥ 768 Kbps Down	54.4%	54.3%	93.1%	92.8%
≥ 3 Mbps Down	39.7%	40.1%	87.2%	86.4%
≥ 6 Mbps Down	20.5%	24.2%	79.9%	78.4%
≥ 10 Mbps Down	11.2%	13.3%	70.1%	68.4%
Cable Modem Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	77.4%	80.8%	89.3%	88.7%
≥ 3 Mbps Down	77.4%	80.8%	89.3%	88.7%
≥ 6 Mbps Down	77.4%	80.8%	89.2%	88.6%
≥ 10 Mbps Down	77.4%	80.8%	89.2%	88.6%
Fixed Wireless Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	83.9%	89.4%	94.7%	94.5%
≥ 3 Mbps Down	83.9%	89.4%	62.0%	62.9%
≥ 6 Mbps Down	0%	0%	34.8%	34.9%
≥ 10 Mbps Down	0%	0%	5.4%	5.4%
Mobile Wireless Technologies	Population	Household	Population	Household
≥ 768 Kbps Down	99.9%	99.5%	98.7%	98.9%
≥ 3 Mbps Down	2.0%	1.4%	92.8%	91.5%
≥ 6 Mbps Down	0%	0%	87.0%	85.3%
≥ 10 Mbps Down	0%	0%	86.9%	85.2%
	Population Count	Household Count	Population Count	Household Count
Totals (2010 Census)	37,220	12,980	6,392,017	2,844,526

Notes: Data presented in table above is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12. Population across Census Blocks and in proximity to Road Segments are based on calculations utilizing U.S. Census 2010 data.

See also the complementary **Southeast Arizona Broadband Technical Report** in Appendix C for additional Graham County broadband maps by each technology type, detailed views of the Safford area, and a table of the 15 broadband providers known to be active in the county including their technology type(s) and speed range(s).

Greenlee County Overview and Broadband Gap Analysis:

Population: 8,802
Labor Force: 4,177
Land: 1,843 sq. miles

Major Industries:	Industry	Establishments	Total Sales
	Retail Sales	61	\$ 36,499,000 1
	Health Care & SocAssist	43	\$ 7,033,000 2
	Prof/Sci/Tech	23	\$ 1,194,000 3
	Other		N/A
	Information	6	N/A
	Real Estate & Rental/Lease	8	N/A
	Admin&Support &Waste Mng.		N/A
	Education		N/A

Where is Mining?

- USDA will continue with broadband, and now look for food/farmer's market projects.
- Update the most used Greenlee County Web site. There is too much old data.
- This is an opportunity for Greenlee to add objectives.

Greenlee County broadband application rankings (highest to lowest priority):

1. Economic Development
2. Telemedicine
3. Education
4. Public Safety

Overall ranking of the four counties:

1. Economic Development
2. Telemedicine
3. Public Safety
4. Education

	<u>Population</u>
Greenlee County	8,599
Clifton (County Seat)	3,349
Duncan	724
Unincorporated (Including Morenci)	4,526

For additional Greenlee County information see:

- Greenlee County - <http://www.co.greenlee.az.us/http://www.co.yuma.az.us/>
- Greenlee County Chamber of Commerce - <http://www.greenleechamber.com/>
- Greenlee County Wikipedia Entry - http://en.wikipedia.org/wiki/Greenlee_County,_Arizona

Greenlee County Broadband Gap Analysis:

- There is excellent DSL coverage in Greenlee County 99.2% of the population able to get DSL at ≥ 768 Kbps downstream, but only 63.8% can get ≥ 3 Mbps, and no service is available at ≥ 6 Mbps. All population centers have some DSL coverage, but far from complete and there is additional coverage in the southwest portion of the county.
- There is limited cable modem coverage in Greenlee County with 57.5% of the population having available service centered in the north Clifton area, but they consistently have access to speeds of ≥ 10 Mbps. There is no cable modem coverage in Duncan or the other more rural areas of the county.
- Fixed wireless (licensed and unlicensed) has a more extensive footprint estimated to reach 99.2% of the Greenlee County population with ≥ 3 Mbps downstream including all population centers, but there is no available service ≥ 6 Mbps anywhere in the county.
- Mobile wireless in Greenlee County has a ubiquitous footprint estimated to reach 99.7% of the population at speeds ≥ 768 Kbps even in many remote areas. However, there is no fourth generation (4G) services with speeds ≥ 3 Mbps downstream available anywhere in the county.
- Greenlee County has benefited from the success of John Lucas, Graham County CIO and Safford's ongoing success. John has served as a liaison to the broadband providers to assist in developing the facilities needed to serve this County, as well as Graham County.
- There is only one known Middle Mile points, almost always fiber fed, available from Level3 Communications, indicating extremely limited fiber infrastructure.
- SpeedMatters.org reports in Greenlee County:

Greenlee County

Zip Code	Tests	Download	Upload
85534	1	832Kbps	382Kbps

The next round of Greenlee County broadband community planning and technical assistance activities will focus on:

- Additional housing for sale and/or rent
- Additional hospitality - motel, hotel, conference facilities
- Industrial park
- Commercial and retail services
- Cell towers for better Public Safety (in process)

Greenlee County Selected Demographics

Baseline Demographics	Greenlee County	State of Arizona
County seat/State capitol	Clifton	Phoenix
Land area in square miles	1,843.13	113,594.08
Population, 2012 estimate	8,802	6,553,255
Population, percent change, 4/1/10-7/1/12	4.3%	2.5%
Persons under 18 years, percent, 2012	28.7%	24.7%
Persons 65 years and over, percent, 2012	12.1%	14.8%
Persons per household, 2007-2011	2.56	2.64
Persons per square mile, 2010	4.6	56.3
High school graduate or higher, percent of persons age 25+, 2007-2011	86.4%	85.2%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	11.9%	26.4%
Per capita income in the past 12 months (2011 dollars), 2007-2011	\$ 20,366	\$25,784
Median household income, 2007-2011	\$ 49,390	\$50,752
Persons below poverty level, percent, 2007-2011	17.2%	16.2%
Homeownership rate, 2007-2011	47.9%	66.6%
Total civilian labor force, 7/13	4,190	3,017,815
Total employment, 7/13	3,905	2,766,640
Total unemployment, 7/13	285	251,175
Unemployment rate, 7/13	6.8%	8.3%

Employment by Category (July 2013 Estimates)	Greenlee County by Population	Statewide by Population	Greenlee County %	Statewide %
Total Nonfarm	3,850	2,453,900	100.0%	100.0%
Total Private Employment	3,375	2,088,300	87.7%	85.1%
Goods Producing	2,875	296,200	74.7%	12.1%
Mining and Construction	-	139,400	-	5.7%
Manufacturing	-	156,800	-	6.4%
Service-Providing	975	2,157,700	25.3%	87.9%
Private Service-Providing	500	1,792,100	13.0%	73.0%
Trade, Transportation & Utilities	275	482,600	7.1%	19.7%
Information	-	39,600	-	1.6%
Financial Activities	-	183,200	-	7.5%
Professional & Business Services	-	360,500	-	14.7%
Educational & Health Services	-	369,700	-	15.1%
Leisure and Hospitality	-	272,100	-	11.1%
Other Private Services	225	84,400	5.8%	3.4%
Government	475	365,600	12.3%	14.9%
Federal Government	25	55,700	0.6%	2.3%
State & Local Government	450	309,900	11.7%	12.6%

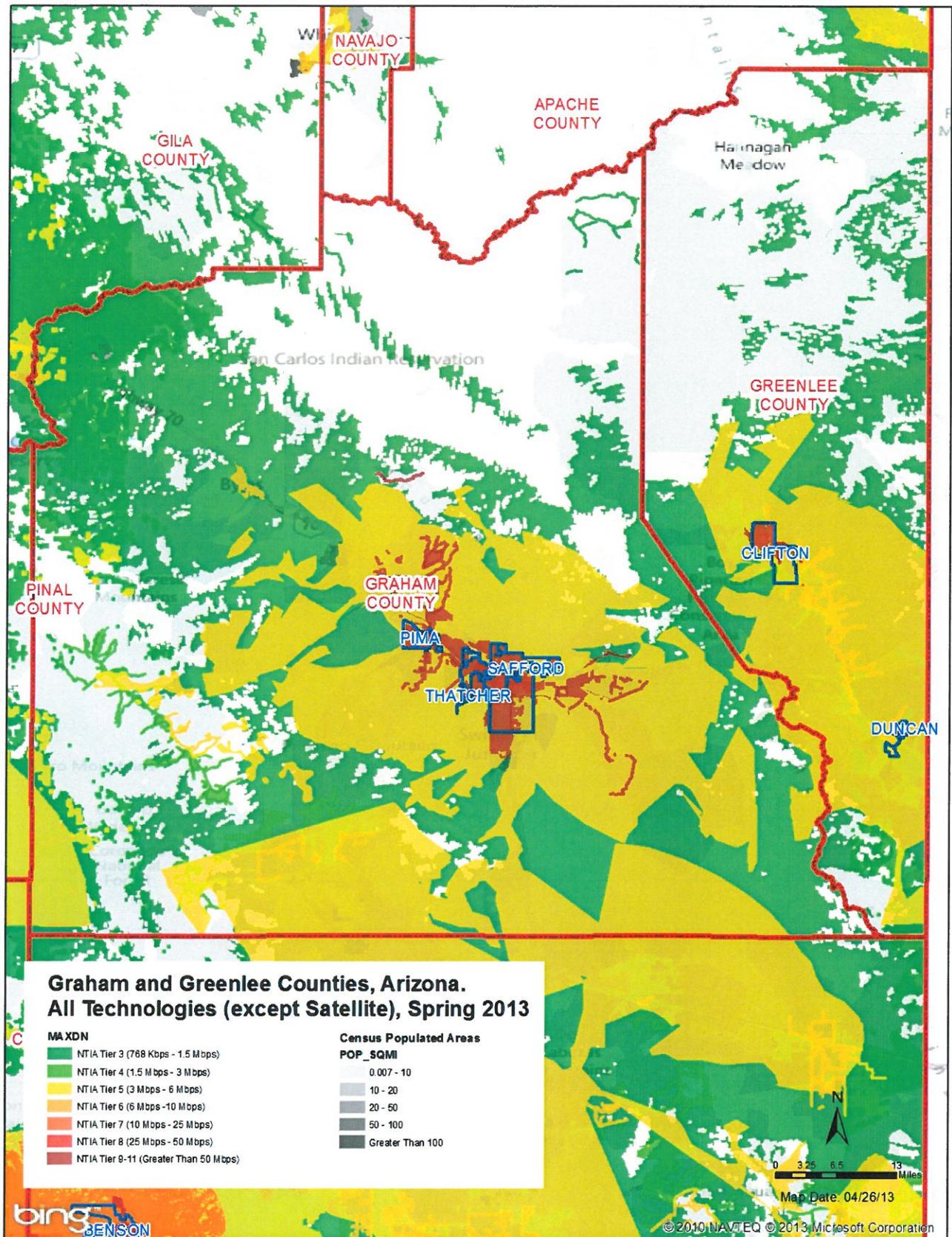
Sources: U.S. Census Bureau State & County QuickFacts (<http://quickfacts.census.gov/>) and ADOA Office of Employment & Population Statistics (<http://www.workforce.az.gov/>). For employment by category estimates, farm employment, private household employment, and self-employment are excluded and all employment statistics are non-seasonally adjusted.

Greenlee County Broadband Coverage for Spring 2013

	Greenlee County		State of Arizona	
	Population	Household	Population	Household
All Broadband Tech (Except Satellite)				
≥ 768 Kbps Down	99.8%	99.1%	99.5%	99.5%
≥ 3 Mbps Down	99.2%	97.4%	97.8%	97.5%
≥ 6 Mbps Down	57.5%	55.8%	95.6%	95.2%
≥ 10 Mbps Down	57.5%	55.8%	95.1%	94.6%
DSL, xDSL & Other Copper Tech				
≥ 768 Kbps Down	99.2%	97.5%	93.1%	92.8%
≥ 3 Mbps Down	63.8%	61.0%	87.2%	86.4%
≥ 6 Mbps Down	0%	0%	79.9%	78.4%
≥ 10 Mbps Down	0%	0%	70.1%	68.4%
Cable Modem Technologies				
≥ 768 Kbps Down	57.5%	55.8%	89.3%	88.7%
≥ 3 Mbps Down	57.5%	55.8%	89.3%	88.7%
≥ 6 Mbps Down	57.5%	55.8%	89.2%	88.6%
≥ 10 Mbps Down	57.5%	55.8%	89.2%	88.6%
Fixed Wireless Technologies				
≥ 768 Kbps Down	99.2%	97.4%	94.7%	94.5%
≥ 3 Mbps Down	99.2%	97.4%	62.0%	62.9%
≥ 6 Mbps Down	0%	0%	34.8%	34.9%
≥ 10 Mbps Down	0%	0%	5.4%	5.4%
Mobile Wireless Technologies				
≥ 768 Kbps Down	99.7%	99.0%	98.7%	98.9%
≥ 3 Mbps Down	0%	0%	92.8%	91.5%
≥ 6 Mbps Down	0%	0%	87.0%	85.3%
≥ 10 Mbps Down	0%	0%	86.9%	85.2%
	Population Count	Household Count	Population Count	Household Count
Totals (2010 Census)	8,437	4,372	6,392,017	2,844,526

Notes: Data presented in table above is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12. Population across Census Blocks and in proximity to Road Segments are based on calculations utilizing U.S. Census 2010 data.

See also the complementary **Southeast Arizona Broadband Technical Report** in Appendix C for additional Greenlee County broadband maps by each technology type, detailed views of the Clifton area, and a table of the 12 broadband providers known to be active in the county including their technology type(s) and speed range(s).



Note: More detailed broadband and infrastructure maps for Graham and Greenlee Counties by individual technology type and for the Safford (Graham) and Clifton (Greenlee) areas may

be found in the complimentary **Southeast Arizona Broadband Technical Report**.

Santa Cruz County Overview and Broadband Gap Analysis:

Population: 47,303
 Labor Force: 17,786
 Land: 1,237 sq. miles

Major Industries:	Industry	Establishments	Total Sales
	Retail Sales	253	\$ 698,785,000 1
	Health Care & SocAssist	393	\$ 68,491,000 2
	Admin&Support &Waste Mng.	293	\$ 39,194,000 3
	Other	423	\$ 20,665,000 4
	Information	30	N/A
	Prof/Sci/Tech	386	N/A
	Real Estate & Rental/Lease	411	N/A
	Education	52	N/A

- USDA will continue with broadband, and now look for food/farmer’s market projects.
- Update the most used Santa Cruz County Web site. There is too much old data.
- This is an opportunity for Santa Cruz to add objectives.

Santa Cruz County broadband application rankings (highest to lowest priority):

1. Economic Development
2. Education
3. Telemedicine
4. Public Safety

Overall ranking of the four counties:

1. Economic Development
2. Telemedicine
3. Public Safety
4. Education

	<u>Population</u>
Santa Cruz County	48,724
Nogales (County Seat)	21,392
Patagonia	936
Unincorporated (Including Rio Rico and Tubac)	26,396

For additional Santa Cruz County information see:

- Santa Cruz County - <http://www.santa-cruz.az.us/http://www.co.yuma.az.us/>
- Nogales-Santa Cruz County Chamber of Commerce - <http://www.thenogaleschamber.com/>
- Nogales Community Development Corporation - <http://www.nogalescdc.org/>
- Nogales-Santa Cruz County Port Authority - <http://www.nogalesport.org/http://www.greateryuma.org/>
- Santa Cruz County Wikipedia Entry - http://en.wikipedia.org/wiki/Santa_Cruz_County,_Arizona

Santa Cruz County Broadband Gap Analysis:

- There is good DSL coverage in Santa Cruz County 90.4% of the population able to get DSL at ≥ 768 Kbps downstream, 81.8% at ≥ 3 Mbps, 67.4% at ≥ 6 Mbps, and 51.1% at ≥ 6 Mbps. All population centers have substantial DSL coverage with some gaps at their periphery.
- There is fair cable modem coverage in Santa Cruz County with 73.0% of the population having available service centered in the Nogales area and north of there, but they consistently have access to speeds of ≥ 10 Mbps. There is no cable modem coverage in Patagonia or the other more rural areas of the county.
- Fixed wireless (licensed and unlicensed) has a more extensive footprint estimated to reach 97.1% of the Santa Cruz County population with ≥ 768 Kbps downstream, however only 9.4% of the population has access to service of ≥ 3 Mbps mostly to the northeast and northwest. There is no available service ≥ 6 Mbps downstream anywhere in the county.
- Mobile wireless in Santa Cruz County has a ubiquitous footprint estimated to reach 99.9% of the population at speeds ≥ 768 Kbps even in many remote areas. There is significant fourth generation (4G) service availability with speeds ≥ 3 Mbps downstream to 94.3% of the population and speeds of ≥ 10 Mbps downstream to 92.6%.
- There a small number of known Middle Mile points, almost always fiber fed, available from CenturyLink, Mediacom Southeast, and Valley Telecom Group, indicating extremely limited fiber infrastructure.
- SpeedMatters.org reports in Santa Cruz County:

Santa Cruz County			
Zip Code	Tests	Mbps Download	Mbps Upload
85645	5	31.8	3.1
85646	1	5.7	0.7
85648	6	3.3	1.5
85621	45	6.9	1.4

The next round of Santa Cruz County broadband community planning and technical assistance activities could focus on:

- Port Authority
- International trade - produce industry
- Increase tourism - retail
- Promote region with social media - Brand, provide activities/ accommodations, promote

Santa Cruz County Selected Demographics

Baseline Demographics	Santa Cruz County	State of Arizona
County seat/State capitol	Nogales	Phoenix
Land area in square miles	1,236.92	113,594.08
Population, 2012 estimate	47,303	6,553,255
Population, percent change, 4/1/10-7/1/12	-0.2%	2.5%
Persons under 18 years, percent, 2012	29.4%	24.7%
Persons 65 years and over, percent, 2012	14.6%	14.8%
Persons per household, 2007-2011	3.55	2.64
Persons per square mile, 2010	38.3	56.3
High school graduate or higher, percent of persons age 25+, 2007-2011	71.2%	85.2%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	18.0%	26.4%
Per capita income in the past 12 months (2011 dollars), 2007-2011	\$ 17,577	\$25,784
Median household income, 2007-2011	\$ 38,092	\$50,752
Persons below poverty level, percent, 2007-2011	26.2%	16.2%
Homeownership rate, 2007-2011	68.9%	66.6%
Total civilian labor force, 7/13	17,961	3,017,815
Total employment, 7/13	14,516	2,766,640
Total unemployment, 7/13	3,445	251,175
Unemployment rate, 7/13	19.2%	8.3%

Employment by Category (July 2013 Estimates)	Santa Cruz County by Population	Statewide by Population	Santa Cruz County %	Statewide %
Total Nonfarm	12,400	2,453,900	100.0%	100.0%
Total Private Employment	8,575	2,088,300	69.2%	85.1%
Goods Producing	625	296,200	5.0%	12.1%
Mining and Construction	-	139,400	-	5.7%
Manufacturing	-	156,800	-	6.4%
Service-Providing	11,775	2,157,700	95.0%	87.9%
Private Service-Providing	7,950	1,792,100	64.1%	73.0%
Trade, Transportation & Utilities	5,000	482,600	40.3%	19.7%
Information	-	39,600	-	1.6%
Financial Activities	-	183,200	-	7.5%
Professional & Business Services	-	360,500	-	14.7%
Educational & Health Services	-	369,700	-	15.1%
Leisure and Hospitality	-	272,100	-	11.1%
Other Private Services	2,950	84,400	23.8%	3.4%
Government	3,825	365,600	30.8%	14.9%
Federal Government	1,775	55,700	14.3%	2.3%
State & Local Government	2,050	309,900	16.5%	12.6%

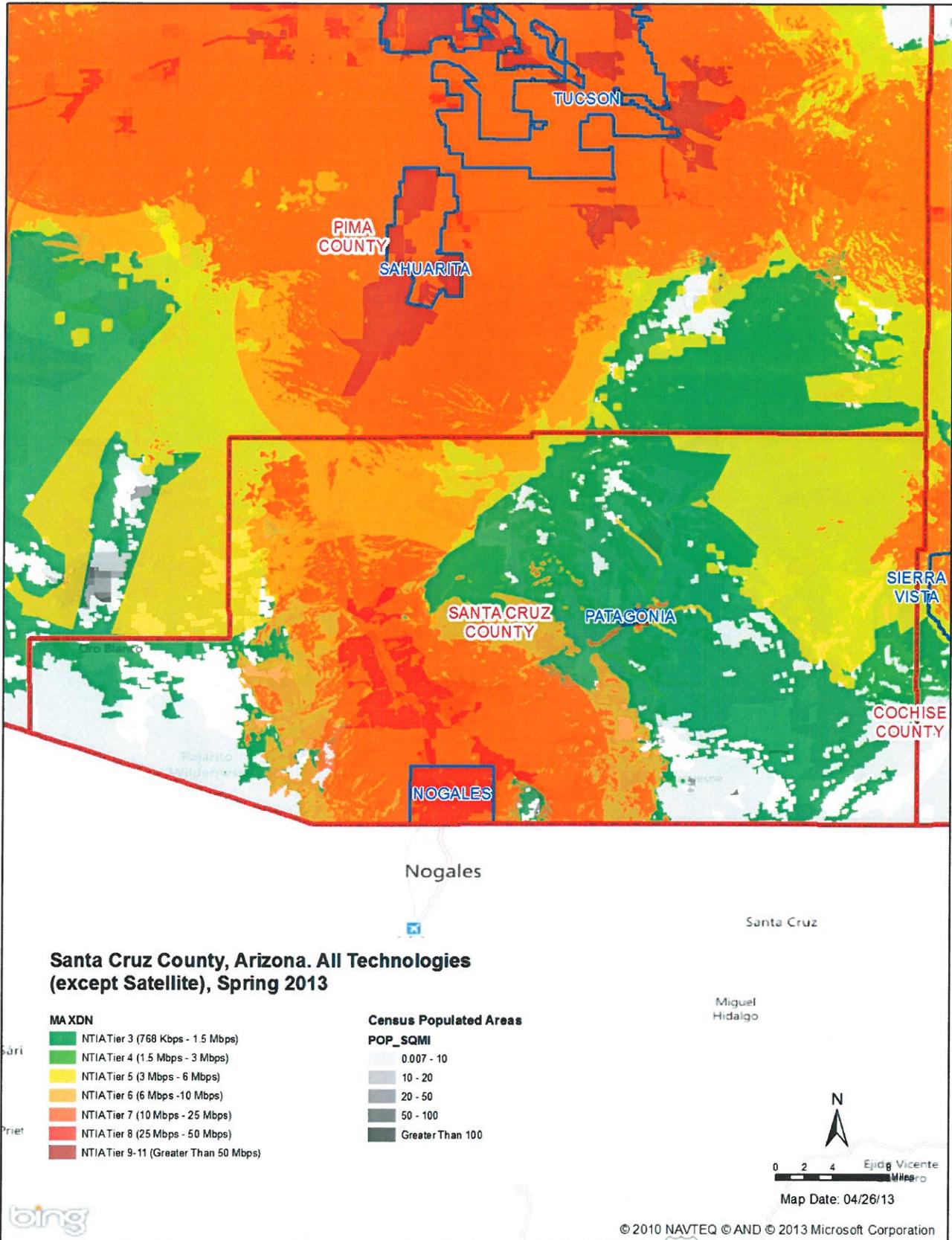
Sources: U.S. Census Bureau State & County QuickFacts (<http://quickfacts.census.gov/>) and ADOA Office of Employment & Population Statistics (<http://www.workforce.az.gov/>). For employment by category estimates, farm employment, private household employment, and self-employment are excluded and all employment statistics are non-seasonally adjusted.

Santa Cruz County Broadband Coverage for Spring 2013

All Broadband Tech (Except Satellite)	Santa Cruz County		State of Arizona	
	Population	Population	Population	Household
≥ 768 Kbps Down	99.9%	99.9%	99.5%	99.5%
≥ 3 Mbps Down	99.3%	99.3%	97.8%	97.5%
≥ 6 Mbps Down	95.7%	95.7%	95.6%	95.2%
≥ 10 Mbps Down	94.8%	94.8%	95.1%	94.6%
DSL, xDSL & Other Copper Tech	Population	Population	Population	Household
≥ 768 Kbps Down	90.4%	90.4%	93.1%	92.8%
≥ 3 Mbps Down	81.8%	81.8%	87.2%	86.4%
≥ 6 Mbps Down	67.4%	67.4%	79.9%	78.4%
≥ 10 Mbps Down	51.1%	51.1%	70.1%	68.4%
Cable Modem Technologies	Population	Population	Population	Household
≥ 768 Kbps Down	73.0%	73.0%	89.3%	88.7%
≥ 3 Mbps Down	73.0%	73.0%	89.3%	88.7%
≥ 6 Mbps Down	73.0%	73.0%	89.2%	88.6%
≥ 10 Mbps Down	73.0%	73.0%	89.2%	88.6%
Fixed Wireless Technologies	Population	Population	Population	Household
≥ 768 Kbps Down	97.1%	97.1%	94.7%	94.5%
≥ 3 Mbps Down	9.4%	9.4%	62.0%	62.9%
≥ 6 Mbps Down	0%	0%	34.8%	34.9%
≥ 10 Mbps Down	0%	0%	5.4%	5.4%
Mobile Wireless Technologies	Population	Population	Population	Household
≥ 768 Kbps Down	99.9%	99.9%	98.7%	98.9%
≥ 3 Mbps Down	94.3%	94.3%	92.8%	91.5%
≥ 6 Mbps Down	93.5%	93.5%	87.0%	85.3%
≥ 10 Mbps Down	92.6%	92.6%	86.9%	85.2%
	Population Count	Population Count	Population Count	Household Count
Totals (2010 Census)	47,420	47,420	6,392,017	2,844,526

Notes: Data presented in table above is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12. Population across Census Blocks and in proximity to Road Segments are based on calculations utilizing U.S. Census 2010 data.

See also the complementary **Southeast Arizona Broadband Technical Report** in Appendix D for additional Santa Cruz County broadband maps by each technology type, detailed views of the Nogales area, and a table of the 19 broadband providers known to be active in the county including their technology type(s) and speed range(s).



Note: More detailed broadband and infrastructure maps for Santa Cruz County by individual technology type and for the Nogales area may be found in the complimentary **Southeast**



Southeast Arizona Regional Broadband Project Profiles:

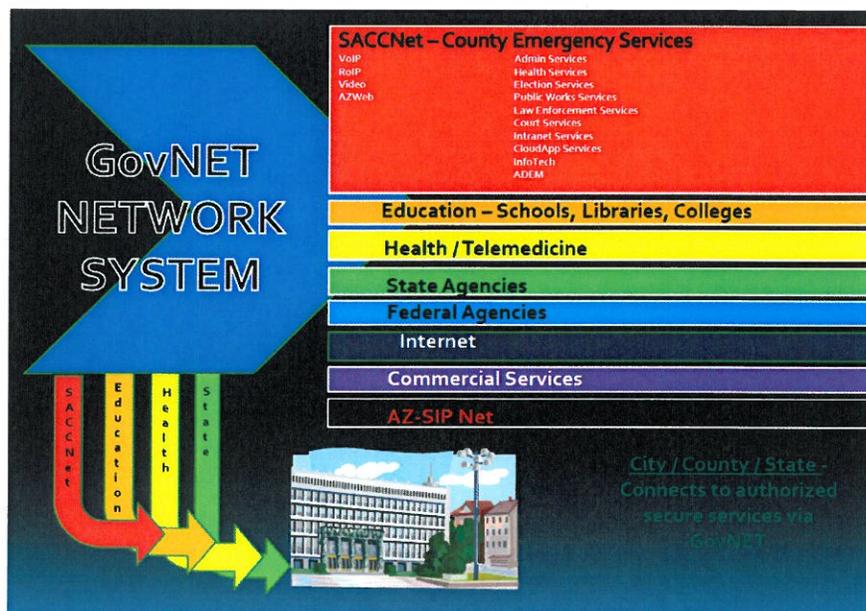
GovNET LLC/SACCCNet BTOP Grant and Planned Network:

GovNET, LLC is a specialized telecommunications provider committed to data integrity, secure high capacity transmissions, and customized network connections at affordable rates. GovNET (<http://www.govnet.net/>) received a \$39.3M Broadband Technology Opportunities Program (BTOP) grant to construct a state-of-the-art multi-purpose interoperable broadband network covering entire State and partners on this project with Telink Networks SW, focusing on the specific needs of local, state, and federal agency communications seeking security and reliability. GovNET build and operations have restarted after an NTIA audit and temporary suspension with a timeline extension to complete the network build and activation.

GovNET will operate as a common carrier providing 8 base pipes with a statewide microwave broadband network to support community anchor institutions and last-mile broadband service providers, addressing critical middle mile infrastructure needs in Arizona's rural counties. The network will offer speeds of between 100-300 Mbps to key anchor institutions, a significant upgrade from the T1 service many key institutions currently have. The resulting statewide broadband network should significantly improve public safety, healthcare delivery, and other critical government services for the people, institutions, and enterprises of Arizona.

SACCCNet is an Application Network utilizing 2 of the 8 base pipes and planning to:

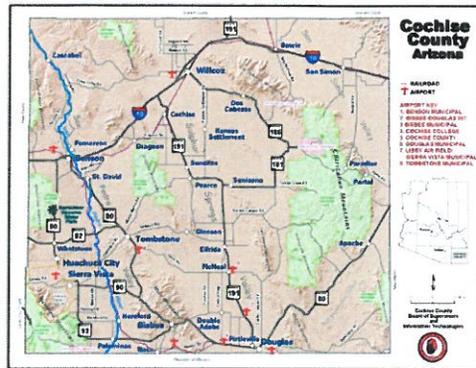
- Construct 316 new microwave towers to expand services across a total of more than 8,400 miles in each of the state's 15 counties.
- Facilitate more affordable and accessible broadband service for an estimated 481,000 households and over 25,000 businesses by enabling local Internet service providers to utilize the project's open network.
- Enable broadband connectivity to as many as 280 anchor institutions, including 15 public safety entities, 82 K-12 public schools, 115 libraries, 14 community colleges, three additional institutions of higher education, 26 healthcare providers, and 26 state and local government facilities.



See the NTIA page at <http://www2.ntia.doc.gov/grantee/govnet-llc> for grant information and the **Southeast Arizona Broadband Technical Report Appendix F: Transportation and Other Public Infrastructure** for GovNET network topology and map views.

A Southeast Arizona Regional Broadband Project Profile:

Cochise County:



Cochise Strategic Plan identified:

BROADBAND APPLICATIONS

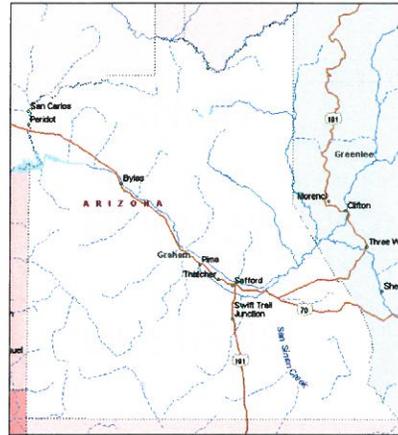
- **Public Safety and Justice** — promote safe communities, strengthen legal services, and ensure access to justiceFirstNet ?
- **Environment and Land Use** — preserve and enhance the rural nature of Cochise County by encouraging open space and wise use of water and other natural resources to sustain and enhance the local economyEconomic Development
- **Infrastructure Management** — prudently manage our investment in civil and capital infrastructureTransportation
- **Health and Wellbeing** — promote public health, safety, and preparedness in all county communitiesTelemedicine

1. Work on the Sector Partnerships:

- a. Utilities Certificate
- b. Mining – education, match skill-sets to industry demands
- c. Medical – enhance telemedicine projects
- d. Southern AZ Logistics Education Organization (SALEO)
- e. Border Security

A Southeast Arizona Regional Broadband Project Profile:

Graham County:

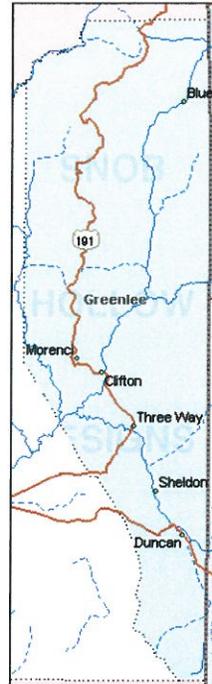


Recommendations:

1. Out of the four counties, Graham has the most government jobs. How can systems and broadband capabilities provide better service to residents and businesses?
2. Work on the 2013 Sector Partnerships:
 - a. Utilities Certificate
 - b. Mining – education, match skill-sets to industry demands
 - c. Medical – enhance telemedicine projects
 - d. Southern AZ Logistics Education Organization (SALEO)
 - e. Border Security
3. Develop a Strategic Plan – include Broadband
 - a. Growth of cities and regions depends largely on access to technology, especially broadband infrastructure

A Southeast Arizona Regional Broadband Project Profile:

Greenlee County:



Currently there is a Greenlee County Courts IT Strategic Plan.

Recommendations:

2. Continue - GRAHAM AND GREENLEE REGIONAL PARTNERSHIP COUNCIL
3. Diversify – ore prices and demand are variables. What can you do when the mines downsize employees?
4. Work on the Sector Partnerships:
 - a. Utilities Certificate
 - b. Mining – education, match skill-sets to industry demands
 - c. Medical – enhance telemedicine projects
 - d. Southern AZ Logistics Education Organization (SALEO)
 - e. Border Security
5. Develop a Strategic Plan – include Broadband
 - a. Growth of cities and regions depends largely on access to technology, especially broadband infrastructure

A Southeast Arizona Regional Broadband Project Profile:

Santa Cruz County:



Recommendations:

1. Develop a Santa Cruz County Strategic Plan – include Broadband
 - a. Growth of cities and regions depends largely on access to technology, especially broadband infrastructure
2. Focus on business and resident retention
3. Work on the Sector Partnerships:
 - a. Utilities Certificate
 - b. Mining – education, match skill-sets to industry demands
 - c. Medical – enhance telemedicine projects
 - d. Southern AZ Logistics Education Organization (SALEO)
 - e. Border Security

Arizona Job Assistance Centers (AzJAC):

A library outranks any other one thing a community can do to benefit its people. It is a never failing spring in the desert.

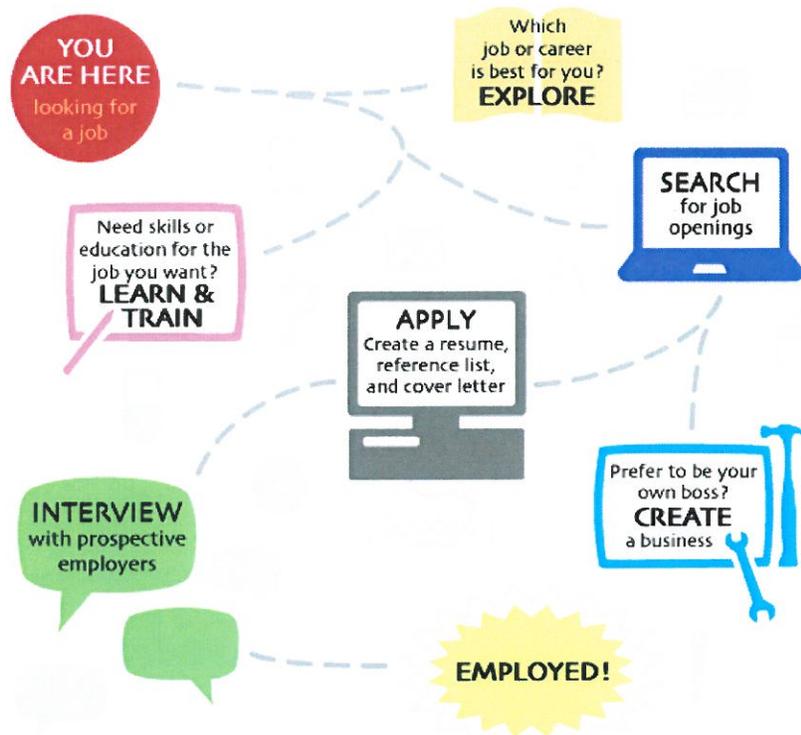
Andrew Carnegie

Public computer centers at libraries in Arizona are overwhelmed with patrons and job seekers who wish to utilize internet access to search for jobs and obtain or improve job related skills training. To address this demand, Arizona Governor's Office of Economic Recovery, in partnership with Arizona State Library, Archives and Public Records, a division of the Secretary of State, developed the Arizona Job Assistance Center (AzJAC - <http://jobhelp.azlibrary.gov/>) with a \$1.6M grant from NTIA BTOP and matching funds of \$706K from the Bill & Melinda Gates Foundation and others.

The AzJAC Project was developed to create public locations throughout the state to assist those seeking employment by means of furthering education and career training. In conjunction with key partners from the Arizona Workforce Connection, the Arizona Department of Education, and the Arizona Small Business Development Center, this project seeks to address the overwhelming need for access to computers for the purposes of searching for and applying for jobs; and to obtain and improve job related skills. Workstations dedicated for job-seekers have been placed in almost 200 libraries statewide. Staff hired in 30 libraries have added new job assistance services including one-on-one counseling, classes and workshops, job clubs library staff training, and collaboration with community organizations and social services.

Specific job help locations for each of Southeast Arizona's counties can be found at:

- Cochise County - <http://jobhelp.azlibrary.gov/county/cochise.html>
- Graham County - <http://jobhelp.azlibrary.gov/county/graham.html>
- Greenlee County - <http://jobhelp.azlibrary.gov/county/greenlee.html>
- Santa Cruz County - <http://jobhelp.azlibrary.gov/county/santa-cruz.html>



Southeast Arizona Broadband Community Planning Next Round:

ASET is providing additional grant funding to continue to support Southeast Arizona Broadband Community Planning and Technical Assistance activities in the second half of 2013. In the Broadband Community Planning area, Systems Technology Staffing (<http://www.stechs.org/>) has been engaged for next round activities as follows:

- Continued development of business case(s) and specific strategies and tactics, including: broadband enabled retention and expansion of Jobs/Employment; improvements in Education including, electronic curricula, assessment and distance learning; improvements in Tele-Health applications and processes between and among the patient, clinic, hospital and physician; and general enhancement of quality of life. These applications are aligned with the Digital Arizona Program (DAP) and a complete system proposal will be prepared for digital capacity expansion in the WACA, three county region.
- Identification of grant writing opportunities and support in WACA's efforts to apply for funding of broadband infrastructure buildouts.
- Continuation and growth of regional sub-committees within the three county region.
- Updates and added resources on broadband-related web pages on the WACA website (and on county sites where appropriate) to communicate progress and foster community interest in the activities listed above.

In the next round, outreach to assess and improve broadband availability and adoption planning and capacity building will focus on four Southeast Arizona regions yet to be selected. The Southeast Arizona Broadband Subcommittee that was organized during April and May of 2013 will continue to hold official meetings and otherwise be informed and engaged via email communications.

Also in the next round, the Southeast Arizona Broadband Subcommittee has the opportunity to partner with the Arizona Telecommunications and Information Council (ATIC - <http://arizonatele.com/>) on the planning and production of a Southeast Arizona Rural Broadband Conference. ATIC has some funding from ASET through the NTIA broadband planning grant and has produced the first of four anticipated half-day Rural Broadband Conferences in Pinetop-Lakeside on July 19, 2013.

Appendix A: Southeast Arizona Broadband Steering Committee

The Southeast Arizona Broadband Steering Committee was organized during April and May of 2013. The committee has held several official meetings, one in person and the others by conference call. There have also been a number of email communications to keep the Committee members informed and engaged.

The input received from the above stakeholders provided the key objectives for each of the three regions. It was determined that the Key Objectives would be as follows: The Sub-Committee will continue to determine the focus for how to develop better internet solutions each of the four applications. It is essential to develop and support ongoing conversations between local leaders in education, healthcare, public safety, business, and economic development in each of the target communities. Only these leaders can develop a plan for aggregating their collective demand for Better Broadband and assist in making an effective case for investment by their communities and the private sector. These local leaders can provide a direct interface to anchor institutions and operators. They can contribute significantly to structuring cooperative planning and financing partnerships among the service providers and their communities, relative to broadband infrastructure.

Interviews have been conducted with key stakeholders. Flaws and limitations have been recognized relative to the current broadband availability. Key areas of concern have been identified from the stakeholders. Objectives have been determined and listed below that respond to these interviews and feedback regarding the need for improved broadband in the four counties of Southeast Arizona. Key stakeholders and their motivation for better broadband are listed below:

Southeast Arizona Broadband Steering Committee:

Government IT Stakeholders:

- Lisa Marra, Grants Administrator Cochise County, lmarra@cochise.az.gov (<http://www.cochise.az.gov/>)
- Brian Adamson, Network Engineer, IT Department, Cochise County, badamson@cochise.az.gov
- John Lucas, IT Director/CIO, Graham County, jlucas@graham.az.gov (<http://72.165.8.69/GrahamWEB13/information-technology-dept/>)
- Charles Berube, IT/IS Director, Greenlee County, berube@co.greenlee.az.gov
- Raul Mavis, IT Director, Santa Cruz County, rmavis@co.santa-cruz.az.us

Committee Support Resources:

- Bill Bolin, VP of Operations, Systems Technology Staffing, LLC (<http://www.stechs.org/>)
- Jim Simms, Telecommunications Consultant, One Random Act (ORAct) LLC
- Mark Goldstein, Southeast Arizona Broadband Consulting Team Member and President, International Research Center (IRC - <http://www.researchedge.com/>)
- Brad Zerbe, ASET/ATII Project Consultant, B2G Solutions (<http://b2g-solutions.com/>)

Economic Development Stakeholders:

- Gussie Motter, Economic Development Manager, Cochise County, <http://cochise.az.gov/>

Educational Technology Stakeholders:

- Carlos Cartagena, VP for IT, Cochise College, <http://www.cochise.edu/>

Transportation Stakeholders:

- Karen Lamberton ???

Healthcare Stakeholders:

- David Chuma, CIO, Copper Queen Hospital, <http://copperqueenhospital.wix.com/cqch>

Public Safety Stakeholders:

- Mark Genz, Commander, Cochise County Sheriff's Office, http://cochise.az.gov/cochise_sheriff.aspx?id=176
- Sturm, Norm, Emergency Services Coordinator, Cochise County, http://cochise.az.gov/cochise_emergency_services.aspx?id=9442
- Scott Howell, Sergeant, Graham County Sheriff's Office, <http://72.165.8.69/GrahamWEB13/sheriffs-office/>
- Gerardo Castillo, Lieutenant, Santa Cruz County Sheriff's Office, <http://scsheriff.com/>
- Pat Sexton, Undersheriff, Greenlee County, <http://www.co.greenlee.az.us/sheriff/>

Appendix B: Arizona Broadband Statistics (for Spring 2013)

	Statewide		Rural		Sparsely Pop. Rural	
All Broadband Tech (Except Satellite) 1 or More Providers	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	99.5%	99.5%	97.5%	97.6%	95.2%	95.7%
≥ 3 Mbps Down	97.8%	97.5%	88.8%	88.3%	81.6%	81.0%
≥ 6 Mbps Down	95.6%	95.2%	78.3%	77.8%	67.3%	65.9%
≥ 10 Mbps Down	95.1%	94.6%	75.8%	75.0%	63.3%	61.6%
All Broadband Tech (Except Satellite) 2 or More Providers	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	98.5%	98.6%	92.7%	93.2%	87.8%	88.7%
≥ 3 Mbps Down	95.6%	95.2%	78.0%	77.3%	67.7%	65.8%
≥ 6 Mbps Down	91.1%	90.1%	60.7%	59.5%	49.8%	47.1%
≥ 10 Mbps Down	89.0%	87.8%	51.8%	50.5%	43.1%	41.1%
All Broadband Tech (Except Satellite) 3 or More Providers	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	97.6%	97.3%	87.7%	87.4%	79.9%	79.2%
≥ 3 Mbps Down	92.3%	91.1%	65.4%	63.7%	55.2%	52.3%
≥ 6 Mbps Down	85.4%	83.6%	44.1%	41.6%	35.4%	32.5%
≥ 10 Mbps Down	81.5%	79.5%	31.2%	29.6%	23.0%	22.3%
DSL, xDSL & Other Copper Tech	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	93.1%	92.8%	73.4%	73.9%	62.5%	64.1%
≥ 3 Mbps Down	87.2%	86.4%	54.9%	55.2%	41.9%	43.0%
≥ 6 Mbps Down	79.9%	78.4%	41.3%	41.0%	30.2%	30.8%
≥ 10 Mbps Down	70.1%	68.4%	31.1%	31.0%	23.8%	24.1%
Cable Modem Technologies	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	89.3%	88.7%	55.5%	55.9%	31.9%	34.3%
≥ 3 Mbps Down	89.3%	88.7%	55.5%	55.9%	31.9%	34.3%
≥ 6 Mbps Down	89.2%	88.6%	55.1%	55.5%	31.5%	33.8%
≥ 10 Mbps Down	89.2%	88.6%	55.1%	55.5%	31.5%	33.8%
Fixed Wireless Technologies	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	94.7%	94.5%	76.1%	76.1%	68.3%	68.6%
≥ 3 Mbps Down	62.0%	62.9%	63.1%	62.1%	53.2%	51.5%
≥ 6 Mbps Down	34.8%	34.9%	24.8%	22.8%	20.1%	17.7%
≥ 10 Mbps Down	5.4%	5.4%	10.4%	8.4%	8.1%	6.6%
Mobile Wireless Technologies	Population	Household	Population	Household	Population	Household
≥ 768 Kbps Down	98.7%	98.9%	93.7%	94.6%	90.2%	91.5%
≥ 3 Mbps Down	92.8%	91.5%	68.0%	65.4%	61.0%	57.2%
≥ 6 Mbps Down	87.0%	85.3%	49.5%	47.0%	47.6%	54.3%
≥ 10 Mbps Down	86.9%	85.2%	49.2%	46.8%	47.1%	43.1%
	Population Count	Household Count	Population Count	Household Count	Population Count	Household Count
Arizona Totals (2010 Census)	6,392,017	2,844,526	1,274,234	601,889	651,358	329,022

Arizona Broadband Coverage Table Notes

See a textual description and analysis of this data in the section below, **Arizona Statewide Digital Landscape and Situational Analysis**.

Data presented in the table above is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12. Population across Census Blocks and in proximity to Road Segments are based on calculations utilizing U.S. Census 2010 data.

The Census Bureau identifies two types of urban areas: **Urbanized Areas (UAs)** of 50,000 or more people and **Urban Clusters (UCs)** of at least 2,500 and less than 50,000 people. Per the Census Bureau, **"Rural"** encompasses all population, housing, and territory not included within Urbanized Areas (UAs). For Arizona analysis purposes, **"Sparsely Populated Rural"** encompasses all population, housing, and territory not included within either Urbanized Areas (UA) or Urban Clusters (UC). Using an Urban Area/Cluster GIS Layer, Arizona is calculated to have a total of 241,666 Census Blocks per the 2010 Census of which:

- 86,648 Census Blocks are in Urban Areas (UAs)
- 19,479 Census Blocks are in Urban Clusters (UCs)
- 106,127 Census Blocks total are in Urban Areas (UAs) or Urban Clusters (UCs)
- 155,018 Census Blocks are in Rural areas (Outside UAs only) with a population count of 1,274,234 and household count of 601,889
- 135,539 Census Blocks are in Sparsely Populated Rural areas (Outside both UAs and UCs) with a population count of 651,358 and household count of 329,022

For wireline providers, census blocks greater than 2 square miles intersected by covered road segments were added to their reported list of census blocks less than or equal to 2 sq. mi. For fixed and mobile wireless providers, census block counts were based on census blocks that intersected (were touched by) an overlaying wireless provider's service area. Satellite providers which tend to offer lower downstream and upstream data rates are not included in the Broadband Providers (BPs) for purposes of this analysis. All census blocks, regardless of area or water characteristic were included in this analysis.

Arizona Statewide Digital Landscape and Situational Analysis

From the Arizona Broadband Assessment Project (AZ BAP) data for Spring 2013, we know that a healthy 99.5% of Arizona households can get broadband of at least 768 Kbps download from at least one provider, not including available satellite service. As we move to rural areas that decreases to 97.6% of households. And for sparsely populated rural areas, the percentage decreases further to 95.7% of households, leaving more than 4% of sparsely populated rural households without any broadband coverage at all except satellite.

When we consider the more reasonable modern connection speed of at least 3 Mbps download, the availability percentages start to visibly decline to 97.5% of households statewide, 88.3% for rural areas, and 81.0% for sparsely populated rural areas leaving some 19% of households in sparsely populated rural areas without what we would consider adequate bandwidth. At a somewhat higher connection speed of 6 Mbps download, the availability percentages more precipitously decline to 95.2% of households statewide, 77.8% for rural areas, and only 65.9% for sparsely populated rural areas leaving some 34% of households in sparsely populated rural areas without such higher performance services.

For the availability of 3 Mbps download from more than a single Broadband Provider, analysis shows that for All Technologies, 97.8% of the statewide population has access to at least one provider, 95.6% access to at least two providers, and 92.3% access to at least three providers. For Arizona's rural areas, 88.8% of the population has access to at least one provider, 78.0% access to at least two providers, and 65.4% access to at least three providers. And for Arizona's sparsely populated rural areas, 81.6% of the population has access to at least one provider, 67.7% access to at least two providers, and 55.2% access to at least three providers.

Looking at specific technologies, DSL, xDSL & other copper delivered services at connection speeds of at least 3 Mbps download are available to 86.4% of households statewide, 55.2% for rural areas, and 43.0% for sparsely populated rural areas. At a somewhat higher connection speed of 6 Mbps download, the availability percentages more precipitously decline to 78.4% of households statewide, 41.0% for rural areas, and only 30.8% for sparsely populated rural areas.

Cable modem services at connection speeds of at least 3 Mbps download are available to 88.7% of households statewide, 55.9% for rural areas, and 34.3% for sparsely populated rural areas. The cable industry has invested heavily in a new generation of DOCSIS 3.0 services to be able to deliver connection speeds of 10 Mbps download or greater to 88.6% of households statewide, but that percentage declines to 55.5% of rural households and only 33.8% of sparsely populated rural households.

Fixed wireless services at connection speeds of at least 768 Kbps download, including Wi-Fi networks and other fixed wireless technologies, are available to 94.7% of individuals statewide, 76.1% for rural areas, and 68.3% for sparsely populated rural areas. At connection speeds of at least 3.0 Mbps, fixed wireless services are available to only 62.0% of individuals statewide, 63.1% of those living in rural areas and 53.2% of those in sparsely populated rural areas.

Mobile wireless services at connection speeds of at least 768 Kbps download, generally 3G services edging into 4G, are available to 98.7% of individuals statewide, 93.7% for rural areas, and 90.2% for sparsely populated rural areas. At connection speeds of at least 3.0 Mbps, well into 4G service range, mobile wireless services have rapidly expanded and are now available to 92.8% of individuals statewide, but only to 68.0% of those living in rural areas and 61.0% of those in sparsely populated rural areas.

Satellite broadband services at connection speeds of at least 1.5 Mbps download are available to all individuals statewide with a view of the southern sky and ability to mount a small satellite dish. Connection speeds of up to 10 Mbps and beyond are available selectively within defined geographic footprints.

Appendix C: Southeast Arizona Broadband-Related Web Presence

The Southeast Arizona Broadband Steering Committee and the project consultants have added broadband information content and links to several of the participating counties' websites. These pages are intended to provide the public and interested communities with information about the work of the Broadband Steering Committee, information about Arizona broadband initiatives via a link to the DigitalArizona.gov website, and reports on Committee activities and specific projects that may be originated by Southeast Arizona communities and/or service providers. Periodic updates will be provided by the Southeast Arizona Broadband Steering Committee and project consultants. Screen snapshots and associated links are included below for reference, but keep in mind the web content is dynamic and may not exactly match this view.



Related Links
Click -> icon to expand menu.

- Facilities Main Page
- Wilcox Airport Master Plan (PDF)
- Arizona's Rural Broadband
- Digital Arizona Program
- What Does Broadband Mean For Rural Arizona

Facilities

Digital Arizona Program

The Rural Arizona Broadband Project has many parts, all integrated to accomplish a better economy with stronger educational purposes. The Digital Arizona Council was formed with private and public officials and representatives to develop top-tier applications that best serve rural Arizona.

The applications consist of:

1. Economic Development – Jobs, with base industry retention and new business attraction.
2. Education – K-12, with connectivity to community colleges and universities to provide competitive educational programs to offer the same competitive programs worldwide.
3. Tele-Health – where a rural resident and patient can be treated without having to drive many miles and spend many hours waiting for treatment and diagnosis.
4. Public Safety – where police, fire, EMT, and forestry can all communicate on multiple devices using common frequencies.

Each one of the program applications helps level the playing field for rural regions and communities to become more competitive. Together they offer continuous opportunities to retain populations, businesses and enhance the quality of life.

The Digital Arizona Program (DAP) is currently developing Regional/Community data sets that identify the assets and infrastructures. These data sets will create a Business Case Analysis that will identify locations to where the best return on investment can be obtained.

[click here to see Digital Arizona Tactical Mode!](#)

For more information about Broadband in Arizona please visit <http://digitalarizona.gov> and <http://aset.azdoa.gov>

SEARCH CENTER
Can't find what you're looking for?
Try our keyword search.

<< Click Here!

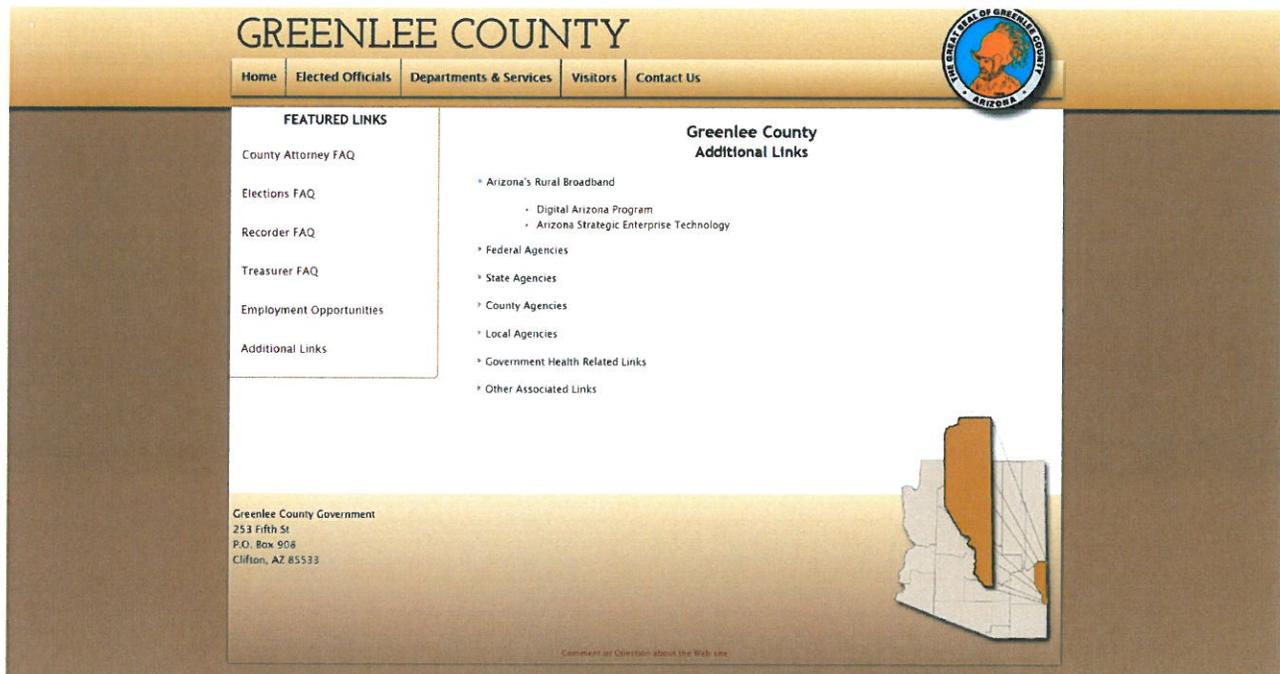
Director
Eddie C. Levins, CPM, CJM

Contact Email
milfores@cochise.az.gov

Location
1415 Melody Lane, Bldg. C
Bisbee, AZ 85803

Phone:
(520) 432-9730
Fax:
(520) 432-9758

http://www.cochise.az.gov/cochise_facilities.aspx?id=12402





You are here: [Home](#) / [Information Technology Dept](#) / Arizona's Rural Broadband

Arizona's Rural Broadband

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- Arizona's Rural Broadband
- What Does Broadband Mean For Rural Arizona?
- GIS Department

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[Planning & Zoning](#)

COURT CALENDAR

[Court dates on the Superior Court, Pima County and Justice Courts](#)
[Calendar](#)

COMMUNITY ASSESSMENT

[View the results of the Graham County Health Department Community Assessment Project](#)

EXPLORE GRAHAM

You will find many links in this area such as history, community resources and lodging. This is a work in progress with much more to come. Take a look!

News & Updates

*Booking Roster *County Connection *County Roads
*Holiday Schedule *Hours of Operation *Official
County Budget *Sealed Bids *Transfer Sales

Tags

Department of the Week

Graham County Treasurer:
[How Do I Pay My Property Taxes Online?](#)

Appendix D: Arizona Broadband Map

Arizona Broadband Map Overview:

The Arizona Broadband Map features two interfaces, one for the general public and another for community planners or more advanced users. Both versions of the map allow substantial flexibility and usability in navigating to, framing, selecting data, and customizing views.

The Arizona Broadband Map (Basic) is a public map at <http://broadbandmap.az.gov/map/> that provides a detailed and multi-layered map showing the availability and advertised performance of High Capacity Digital Services (Broadband) in the State of Arizona by individual street address or at any point selected. The latest data set for Spring 2013 is current as of December 31, 2012. Links are provided to many providers' websites when the provider is identified as one of those serving an address or location.

The Community Broadband Planning Map at <http://broadbandmap.az.gov/CommunityPlanningMap/> includes a large collection of map layers with a rich set of Spatial Analysis Tools to help community planners make better broadband decisions for their community. The powerful application has Population and Housing data down to the Census Block level. Community broadband consultants have also prepared profile spreadsheets for each Arizona community which are linked from the map and downloadable. There are 16 such community profiles across the Southeast Arizona counties.

Both the Basic and Community Broadband Planning mapping applications use ArcGIS Server Technology from Esri, and are accessible by anyone with an Internet connection.

Arizona Broadband Map Details:

The Community Broadband Planning Map was designed to help Community Planners make better broadband decisions for their community and other advanced users optimize and exploit the available data. The central idea behind this added map version was to present a set of tools that would help a planner identify their study area, find all combinations of Broadband Providers, Service Types and Advertised Download/Upload speeds, and quickly chart out the Population and Housing data showing the number of people, average median age, households, average household size, total area, etc.

What makes Arizona's Community Planning Map unique is the power and flexibility it gives users to perform spatial analysis. For example, users can perform a spatial search to find all the Libraries within a specific Zip code. Subsequently, a 2-mile buffer can be drawn around a Library to find all the public schools that fall within this 2-mile radius. The Advertised Upload and Download Broadband Speeds and Service Types to these schools can be instantly charted. Further, all the Census Blocks falling within this 2-mile buffer can be selected and their attributes can be exported to a spreadsheet. Users can easily determine the number of people living within 2 miles of a Library; find their average median age, the total number of households, etc.

All of Arizona's Broadband Providers and their associated metrics can be easily viewed and the results saved as a Comma or Tab Delimited File for further analysis. Available details about the communities or any selected geography include population, gender population, median resident age, Arizona's median age, zip codes, unemployment rate, estimate median

household income, median cost of home, population 25 years and over with educational levels, major employers, and occupations.

A Community Planner can readily measure the area and perimeter of their community; find the distance from the nearest Central Office, or major road or highway; and quickly view the Broadband Provider footprints of every provider in the vicinity. Spatial Searches can be made based on a Census Block, Census Block Group, Census Tract, Zip code, School District, County, City or Town, or any arbitrary polygon drawn on the map and combined with demographic criteria and data.

Once a search area is defined, users can easily locate Community Anchor Institutions (CAIs) including Schools, Libraries, Hospitals, Fire Stations, Police Departments, businesses with public wireless networks, etc. plus infrastructure assets such as cellular towers falling within this area. Once searched, one can proceed to draw buffers around selected features, to continue the spatial search process and preparation of custom map views with great utility. The capability to work with percentage of the population below the poverty line has recently been added. As has the ability to visualize and run proximity buffers around selected highway road segments

Some of the latest features added include the capability to build an SQL statement to display the Broadband Footprints of a specific Provider. For example, one can:

- Display the Broadband Footprints of a selected BP such as AT&T Mobility, showing all their speed tiers;
- Further modify the SQL Statement to display only Download Speed Tier = 7, which helps to display just the 4G coverage areas of AT&T Mobility;
- Save your SQL Statements to Notepad for later use;
- Build similar SQL Statements to display the 4G coverage areas of some other carrier, such as Verizon; and
- Display the combined 4G coverage areas of AT&T and Verizon.

We believe Arizona is unique among the 50 States to have this mapping capability to isolate and display Broadband Coverage areas by a given BP and a given Speed Tier.

Arizona Broadband Map Tutorials:

Twenty-four tutorials on how to use various features of the map are available on a dedicated YouTube channel at <http://www.youtube.com/user/ArizonaBroadband>. In addition to providing instructions generally on how to use the map, they also demonstrate functions such as:

- Finding an Address,
- Identifying Broadband Providers,
- Displaying the Map Layers,
- Identifying Community Buildings,
- Buffering Points,
- Graphical Search,
- Text Search,
- Spatial Search and
- Using the Select Widget.

Arizona Community Broadband Planning Map Screenshot

Arizona Broadband Map
Community Planning Version 5

Provider: AT&T MOBILITY
Type: MOBILE WIRELESS
Download: 1.5 - 3 Mbps
Upload: 768 Kbps - 1.5 Mbps
DownTier: 4
UpTier: 3
<http://www.att.com>

Select

Selection Results...

Broadband Providers (3)

Provider	Type	Download	Upload	Website	DownTier	UpTier
AT&T MOBILITY	MOBILE WIRELE	10 - 25 Mbps	3 - 6 Mbps	http://www.att.cor	7	5
AT&T MOBILITY	MOBILE WIRELE	1.5 - 3 Mbps	768 Kbps - 1.5 M	http://www.att.cor	4	3
AT&T MOBILITY	MOBILE WIRELE	3 - 6 Mbps	3 - 6 Mbps	http://www.att.cor	5	5

<http://broadbandmap.az.gov/CommunityPlanningMap/>

City of Sierra Vista Community Partial Profile Screenshot

Sierra Vista, Arizona



Sierra Vista

Population in 2011: 45,166. Population change since 2000: +19.6%

Males: 22,984 (50.9%)

Females: 22,182 (49.1%)

Median resident age: 33.1 years

Arizona median age: 37.1 years

Zip codes: 85635, 85636, 85650, 85671.

Sierra Vista Zip Code Map

Estimated median household income in 2009: \$56,245 (it was \$38,427 in 2000)

Sierra Vista: \$56,245

Arizona: \$48,745

Estimated per capita income in 2009: \$26,773

Sierra Vista city income, earnings, and wages data

Estimated median house or condo value in 2009: \$210,692 (it was \$100,000 in 2000)

Sierra Vista: \$210,692

Arizona: \$187,700

Mean prices in 2009: All housing units: \$216,412; Detached houses: \$231,391; Townhouses or other attached units: \$214,000; In 3-to-4-unit structures: \$165,707; Mobile homes: \$70,827; Occupied boats, RVs, vans, etc.: \$95,113

Median gross rent in 2009: \$798.

For population 25 years and over in Sierra Vista:

High school or higher: 91.5%

Bachelor's degree or higher: 25.7%

Graduate or professional degree: 7.5%

Unemployed: 4.1%

Mean travel time to work (commute): 15.7 minutes

Most common industries in 2005-2009 (%)

Public administration (24%)

Professional, scientific, and technical services (20%)

Retail trade (9%)

Accommodation and food services (7%)

Construction (7%)

Administrative and support and waste management services (6%)

Health care and social assistance (4%)

Most common occupations (%)

Law enforcement workers including supervisors (8%)

Computer specialists (7%)

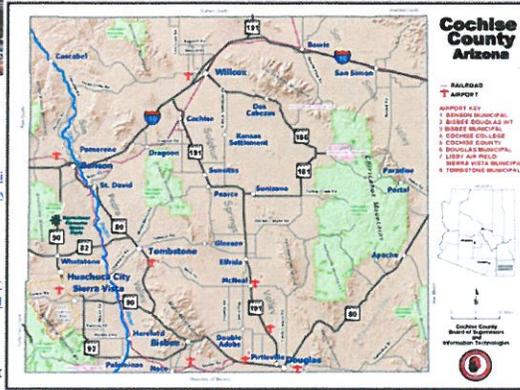
Electrical equipment mechanics and other installation, maintenance, and repair occupations including supervisors (6%)

Building and grounds cleaning and maintenance occupations (4%)

Material recording, scheduling, dispatching, and distributing workers (4%)

Retail sales workers except cashiers (3%)

Other management occupations except farmers and farm managers (3%)



Company Name	Address	City	State	ZIP Code	Executive Title	Fax Number Combined	USA Number	Location	Employee Size Range	Location Sales Volume Range	Phone Number Combined	Primary SIC Code
B Guys & A Gal Painting LLC		Sierra Vista	AZ	85613		0000000000	42-654-2612		1 to 4	\$1-2.5 Million	(520) 266-4062	172101
J Single B	2240 S Mosen Rd	Sierra Vista	AZ	85635		0000000000	26-586-4652		1 to 4	\$1-2.5 Million	(520) 439-9458	025902
A Alpha Bonding & Svc LLC	9191 E Ramsey Rd	Sierra Vista	AZ	85650		0000000000	68-283-6101		1 to 4	\$1-2.5 Million	(520) 803-9177	635101
A E & L Construction Co	PO Box 1394	Sierra Vista	AZ	85636	President	0000000000	41-810-8697		1 to 4	\$1-2.5 Million	(520) 378-0100	152144
A To Z Repair Remodeling		Sierra Vista	AZ	85635	Principal	0000000000	40-572-2780		1 to 4	\$1-2.5 Million	(520) 459-4538	152144
A1 Autos	888 S Highway 92	Sierra Vista	AZ	85635		0000000000	40-989-5074		1 to 4	\$1-2.5 Million	(520) 459-6195	551103

<<>> | Cochise | Bisbee | Benson | Douglas | Sierra Vista | Wilcox | Tombstone | Huachuca City | Cochise to Arizona |

Appendix E: DAP Broadband Grants & Resources

Under the auspices of the Southeast Arizona Broadband Steering Committee, an extensive **DAP Broadband Grants & Resources Guide** has been developed for **Digital Arizona Program (DAP - <http://azbroadband.gov/>)**. Please reference the separate standalone document who's Table of Contents follows:

DAP Broadband Grants & Resources Guide

Table of Contents

Preface

Broadband Grants Seekers Introduction

State of Arizona Grant Opportunities

- Arizona Strategic Enterprise Technology Office (ASET)**
- Arizona Governor's Office**
- Arizona Department of Education**
- Arizona State Library, Archives and Public Records**
- Arizona Department of Homeland Security**
- Arizona Department of Commerce (ACA)**
- Science Foundation of Arizona (SFAz)**
- Arizona Corporation Commission (ACC)**
- Arizona Telemedicine Program (ATP)**
- Arizona Grantmakers Forum (AGF)**

Federal Government Grant Opportunities

- General Federal Grant Sources**
- U.S. Dept. of Agriculture (USDA) Rural Utility Services (RUS)**
- Federal Communications Commission (FCC)**
- U.S. Dept. of Commerce (DOC) National Telecommunications & Information Administration (NTIA)**
- U.S. Dept. of Commerce (DOC) Bureau of Economic Analysis**
- Education & Libraries Specific**
- Telehealth Specific**
- Public Safety Specific**
- Small Business Innovation Research (SBIR)**
- Small Business Technology Transfer (STTR)**
- Small Business Administration (SBA) Programs**

Other Grant Opportunities

- Foundations and Trusts - Arizona Specific**
- Foundations and Trusts - National**
- Company and Community Investment**

DAP Broadband Grants & Resources Guide

Table of Contents (Continued)

Broadband Resources

Federal Resources

State Digital Capacity Plans and Resources

Arizona State Resources

National Nonprofit Organizations

National Trade Associations

Arizona Nonprofit Organizations and Trade Associations

National eLearning and Technology in Education Resources

Arizona eLearning and Technology in Education Resources

National Telehealth Resources

Arizona Telehealth Resources

National eGovernment Resources

Arizona eGovernment Resources

National Discovery, Innovation and Research Resources

Arizona Discovery, Innovation and Research Resources

National Smart Energy and Environmental Resources

Arizona Smart Energy and Environmental Resources

National Public Safety Communications Resources

Arizona Public Safety Communications Resources

National Native American Resources

Arizona Native American Resources

Arizona Statistical Resources

Community Toolkits, Economic and Financial Modeling

Appendix F: Glossary of Telecom Terms

3G or Third Generation Wireless: This refers to the current state of cellular wireless data communications being actively deployed as a market overlay first in urban areas and along transportation corridors. The first generation was analog and the second was digital (CDMA, TDMA and GSM).

4G or Fourth Generation Wireless: This refers to the next step up for mobile wireless currently standardized and beginning to be deployed. Fourth generation systems provide higher-speed data connections of up to 100 Mbps for high mobility users and 1 Gbps for low mobility users, both fixed and mobile.

5G or Fifth Generation Wireless: This refers to the anticipated next step up for mobile wireless beyond 4G, but not yet standardized. Fifth generation systems will likely provide higher-speed data connections, both fixed and mobile with greater spectral and/or energy efficiency with improved service quality and user experience.

Asymmetric: A connection with more capacity in one direction than the other. Most DSL and cable modem links are asymmetric, with higher capacity (speed) in the downstream path.

Attenuation: the deterioration of a signal over distance. Also may be referred to as "loss"

Backbone: This refers to the highest speed and widest bandwidth point of a communications circuit or path. In most cases data sources such as shared servers are connected to the backbone, with lower bandwidth circuits extending to user stations.

Backhaul: The intermediate links between the backbone of the network and the sub-networks or provider networks. See also "middle mile."

Bandwidth: The amount of data (capacity) that can be carried by a circuit between two points of a network. Bandwidth is typically measured in Kilobits per second or Megabits per second (shortened to Kbps and Mbps). The top speed of modems is 56 Kbps. One strand of fiber optics can carry 20,000,000,000 bits per second (20 Gbps) or more.

Base Station: The central radio transmitter/receiver that maintains communications with end user sites within a given range. Although many base station site antennas are placed on specially constructed towers, where existing structures provide a site that is higher than its surroundings, antennas can be placed on those structures. For example, antennas have been placed on water towers, grain silos, and building rooftops.

BPL: Broadband over Power Line: A technology that allows broadband services to be delivered via electric lines. BPL is discussed in the **Potential Broadband Technologies** section of this report.

Broadband: A generic term for high-speed data transmissions. The current federal definition of broadband is a minimum of 768 Kbps downstream and 200 Kbps upstream.

Cable Modem: A device used to provide data services over a cable TV network. Users in a given locality (determined by the provider) share the available bandwidth, so when many local users are connected simultaneously they experience slower network performance.

Cell: The basic geographic unit of a wireless system, also the basis for the generic industry term 'cellular.' A geographic area is divided into 'cells,' each of which is equipped with a low-powered radio transmitter/receiver. The cells can vary in size depending upon terrain, capacity demands, etc. See also Base Station, Cell Site.

Cell Site: The place where communications equipment is located for each cell. A cell site includes antennas, a support structure for those antennas, and communications equipment to connect the site to the rest of the wireless or wired network. The equipment is normally housed in a small shelter or "hut" at the base of the site. See also Base Station, Cell.

Central Office: A term used by carriers when referring to switching points. May also be called a local exchange or telephone exchange.

CLEC: Competitive Local Exchange Carrier. A new entrant in a telecommunications market previously limited to one carrier. Contrast with ILEC.

Co-location: The siting of two or more separate companies' (or departments') equipment in or on the same structure/tower or building.

Contention: When multiple customers share a finite amount of broadband capacity and simultaneous use, they "contend" or compete with one another for that limited resource. Contention may be due to increased use or to inherent system design constraints. Synonymous with oversubscription.

CPE: Customer Premises Equipment. CPE is a term that refers to any equipment that is located at the customer's site.

Downstream/download: Data transfer from the web/Internet "down" to the customer. Typically measured in thousands of bits per second (Kbps) or millions of bits per second (Mbps). See also Upstream/upload.

DS-3 (Digital Signal, Level 3): A 44.736 Mbps carrier facility, (also referred to as a T3, and generally thought of as 45 Mbps), which is the equivalent of 28-T1 connections

DSL: Digital Subscriber Line. A service providing data connectivity (to the Internet or private networks) over ordinary copper telephone lines. DSL circuits are switched, not shared as cable modems, but bandwidth can vary greatly, based on both distance and the quality of the circuit. There is typically a distance limitation of approximately 12,000 to 18,000 feet from the nearest main facility (telephone company central office or equivalent).

DSLAM: DSL Access Multiplexer. Used to aggregate many DSL connections onto a single higher-bandwidth connection/link. DSLAM equipment is typically placed in above-ground equipment cabinets within or at the edge of neighborhoods.

Ethernet: Ethernet is a family of computer networking technologies for local area networks (LANs), standardized in 1985 as IEEE 802.3 and largely replacing competing wired LAN technologies. It is generally carried over twisted pair wiring and fiber optic links in conjunction with hubs or switches at data rates from 10 Mbps to 1 Gbps on LANs and up to 100 Gbps on MANs and WANs.

FCC: Federal Communications Commission. The government agency responsible for regulating telecommunications in the United States.

Fixed wireless: Refers to wireless systems that are permanently installed and designed to cover a specific area or site.

Gbps: Gigabits per second. A thousand Mbps or a million Kbps.

ILEC: Incumbent Local Exchange Carrier. The former monopoly local telephone carrier. Contrast with CLEC.

ISP: An Internet service provider is a business or organization that offers users access to the Internet and related services. Many but not all ISPs are telephone companies or other telecommunication providers and may be organized as commercial, community-owned, non-profit, or otherwise privately owned entities. They may provide a variety of services such as Internet access and transit, domain name registration, web site hosting, and colocation.

Kbps: Kilobits per second. Thousands of bits per second.

LAN: Local Area Network. A local area network is a computer network interconnecting computers, storage, and other peripherals in a limited area such as a home, school, computer laboratory, or office building over a small geographic area using Ethernet, Wi-Fi, and possibly other short range interconnection technologies. See also MAN and WAN.

"Last-mile" (sometimes referred to as "first mile"): This term is used to describe the final connection to a building as opposed to the high capacity circuits extending across a city or county. This connection is often the bottleneck that prevents high-speed network connectivity, due to lack of high capacity cabling options. Contrast with "middle mile."

Latency: The time it takes for a signal to travel between two points on a network. Also referred to as "delay". When there is significant latency a normal voice conversation may be very difficult as the parties must wait for responses and may "talk over" each other.

Leased Line Services: These are typically communications circuits provided by a telephone company or cable company and leased for a monthly fee to a customer such as a city or school district. Typical leased lines include T-1 and T-3.

Line of Sight (LOS): Transmission limited to straight lines and in which the transmitting/receiving locations can be viewed/seen from one another. Most wireless wide area network transports require a line of sight from the sending location to the receiver.

MAN: Metropolitan Area Network. A metropolitan area network is a large computer network that spans a medium size geographic area such as a campus up to an entire metropolitan area, falling between a LAN and WAN. MANs provide Internet connectivity for LANs in a metropolitan region, and connect them to wider area networks like the Internet. See also LAN and WAN.

Mbps: Megabits Per Second - Million bits per second. Telephone modems operate at Kbps (thousands of bits per second) speeds, whereas local area networks operate at Mbps. See also Gbps.

Microwave: The portion of the electromagnetic spectrum, beginning with 1 GHz, which is used for many different wireless communications. Microwave links are often used in links where there is a line of site and a distance of less than 30 miles.

Middle mile: May also be referred to as backhaul. The links between ISPs and local or regional broadband service providers are considered "middle mile" connections. Contrast with "last mile".

Monopole: A slender, self-supporting tower on which wireless antennas can be placed.

Oversubscription: See contention.

PROW: Public Right-of-Way or Public Rights-of-Way. The land/areas owned by a public entity such as a city or county that are used for installation of telecommunications and other services. For example, most counties own and control the PROW along county roads.

Right-of-Way (for outside plant cable): Refers to a designated space alongside a street or other access (such as a railroad line). An entity wishing to install cable among buildings must obtain the rights to a pathway for that cable. Right-of-way access must be granted by the owner of the path to be used, which may include public landowners (city, county, etc.), private landowners (railroad companies), or the owners of poles such as cable, telephone, or power companies. Cities typically require written permits for the use of their rights-of-way - usually for a fee. See also PROW.

Router: A device that "translates" among different types of network connections and speeds, and can also perform basic security functions. Routers are most frequently used at the point of incoming services such as ISP or carrier WAN connections.

Site Survey: Internet service provider personnel visit your home or business location to determine whether service is/can be made available there.

Symmetric: Used to describe communications technologies in which the upstream and downstream data rates are identical - e.g., High Bit-rate Digital Subscriber Line.

T-1 (DS1): In the United States the T-1 standard has a speed of 1.544 Mbps. T-1 circuits usually are provided by telephone companies using copper cabling, but fiber and wireless systems can be set up to provide T-1 connectivity as well.

Take Rate: The percentage of households or business that are offered service who choose to subscribe to that service. For example, if DSL service were available to 100 households and 33 elected to "take" that DSL service, the take rate would be 33%.

Underserved and Unserved: The FCC recently defined these terms that describe areas that lack broadband access. For complete definitions refer to the July 9, 2009 Federal Register Notice of Funds Availability (NOFA) at: http://www.ntia.doc.gov/files/ntia/publications/fr_bbnofa_090709.pdf.

Upstream/upload: Data transfer from the customer back to the web/Internet or provider. Typically measured in thousands of bits per second (Kbps) or millions of bits per second (Mbps). See also Downstream/download.

VoIP: Voice over Internet Protocol. A technology that puts voice (telephone) conversations over an IP “data” network. Can be used to aggregate (or “trunk”) multiple calls between buildings, or for individual calls from an IP-enabled telephone or from a computer equipped with a microphone and speaker. Skype is one example of VoIP.

VPN: Virtual Private Network. A network set up for specific sites and users and open only to authorized users. A VPN uses encryption to prevent communications from being deciphered by non-authorized personnel.

WAN: Wide Area Network. A wide area network is used to extend connectivity beyond a building or campus, usually through telephone carrier facilities, but may also be privately installed and owned. See also LAN and MAN.

Wi-Fi: Wi-Fi is a popular technology that allows an electronic device to connect to a LAN and through it to exchange data or connect to the Internet wirelessly over unlicensed spectrum with various levels of encryption and security. Devices connect to network resources via a wireless network access point (AP) or hotspot with a range of up to about 65 feet indoors and greater distances outdoors depending on configuration, antennas, and mesh connections with other Wi-Fi APs. Wi-Fi is defined by IEEE 802.11 wireless LAN standards

WiMAX: WiMAX (Worldwide Interoperability for Microwave Access) is a wireless communications standard designed to provide some 30 to 40 megabit-per-second data rates and up to 1 Gbps for fixed locations enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL. It is similar to Wi-Fi, but it can enable usage at much greater distances and speeds. WiMAX is defined by IEEE 802.16 wireless LAN standards ratified by the WiMAX Forum. A variant, Mobile WiMAX is being selectively employed to complement or compete with 4G mobile wireless.

Wind load: The designed capacity of a tower to withstand wind forces. Each structure (mast, antenna, etc.) added to a tower adds to the overall wind load of that tower.

WISP: Wireless Internet Service Provider. A company that distributes Internet service via wireless networking. In order to provide service to a given location or territory. A WISP may develop its own tower sites and/or may lease space on towers or structures owned by others.