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BROADBAND LOCAL PLANNING ASSISTANCE TO ARIZONA COMMUNITIES

PROVIDED BY
**Central Arizona Governments
(CAG)**

March 2013

Digital Arizona
} **Expanding Innovation**
} **Through Connectivity**

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CAG Region / Counties



Figure 1

The Central Arizona Government (CAG) region consists of two counties out of Arizona's fifteen counties. The two CAG counties are Gila and Pinal. CAG is one of six Councils of Government in Arizona.

Executive Summary

CAG is a nonprofit membership corporation representing local governments to provide a wide variety of services within the two rural Arizona counties of Pinal and Gila. From these two counties - respective communities and business opportunities were identified for this business case.

This Business Case Analysis focuses on digital capacity for the Central Arizona Governments (CAG). It 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 Recovery Act and the Broadband Data Improvement Act, which envisioned a comprehensive program, led by state entities or non-profit organizations working at their 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 that infrastructure.

Work with the two counties consisted of developing Community Data Sets, integrating these data sets with the Arizona Broadband Map and identifying broadband providers and their respective services. Broadband speeds by county/zip codes were obtained for the two counties from *speedmatters.org*. The Service Provider and Services were generated from the Arizona Digital broadband Map. Current infrastructure including providers and services, utilities, roads and rail are identified in the Community Data Sets. The results confirm rural Arizona requires more hi-speed Internet capacity.

Arizona ranks 45th in the nation with a 4.8 Mbps average speed experienced by broadband subscribers, according to the Akami speed reporting for the second quarter 2012. Forty six percent of Arizona households have internet speeds that are below the minimum National Standards, that are 4 Mbps download and 1 Mbps upload.

Minimum Sufficient Speed thresholds were identified for the four major application areas and the consisted of 10Mbps Download and 5Mbps Upload to support Economic Development, Education, Telemedicine and Public Safety. The Business Case Analysis identifies CAG regions with limited broadband capacity. This is a critical issue that must be resolved for continuous economic development to continue. In all cases - no community reviewed in these three CAG regions could be identified to meet the threshold standards for all four applications.

Studies show the connection between economic development and high 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 4Mbps) or equal to \$249 million potential Arizona Rural Increase/Year from digital capacity expansion.

The next generation of Internet will utilize real time video which requires much higher demand for broadband capacity to do a multitude of different types of work. For example, businesses that are in any community are going to need to have access to real time video for collaboration, and telework that drives the need for more broadband. Modern Internet is video intensive, and increases by ten times the demand for video. Future uses of broadband will require even more capacity.

Conclusion and Recommendations:

CAG must now put in place action plans, as identified in the Systems Requirements to move forward and advance broadband capacity requirements for the major four major applications within each of two county's regions and communities. These action plans will require group leaders for each of the applications, defined community requirements, identification of local infrastructure assets, service provider/service(s) and availability, including the formulation of a ROI and an implementation schedule.

The transformation from community planning to technical assistance has begun. Payson is a target for local distribution capacity, in order to serve more businesses and residents. Planning/zoning and permitting, broadband enhancements are currently underway with two major business enterprises (UPRR at Redrock and Resolution Copper in Superior, AZ). Providers and communities located in the Sun Corridor region in central Pinal County will most likely have the bigger impact due to economic development including manufacturing, transportation and shipping/logistics. Mining and tourism in eastern Pinal county help make up the character of Arizona's fastest growing County. Community planning (by the Sub-Committee is the process of evaluating action plans as defined in the Systems Requirements. Technical assistance has begun by working with Payson (broadband distribution), with enhanced connections to facilities and families. Work with the San Carlos Apache Tribe, their Telecom group, the Town of Dudleyville and Pinal County is currently underway.

Action is already occurring in Payson, Arizona. Payson is currently underway working with the service providers (Frontier and CenturyLink), the community stakeholder, and CAG's Technical Assistance team. All are working on planning/zoning and permitting to increase broadband capacity in order to support the applications and sustain community progress.

Communities will continue to focus on the benefits of broadband and how it can further sustain a region and a community's vital sustainability. One of many factors that lead to broadband projects include the knowledge of knowing the current capacity and realizing what is required to support the demand of future applications (speed tests are essential factors).

Identifying the need for rural broadband capacity

Below is a table of recommended speeds relative to specific applications. The recommended speeds for digital applications from the California Broadband Task Force for various applications involving business and jobs, education, telemedicine and public safety are identified in the table. A recommended speed standard of 10 Mbps download and 5 Mbps upload is seen in the graph below. These speeds support necessary requirements for the major applications.

Upstream and Downstream Speed Range	Applications
500 kbps – 1 Mbps	Voice over Internet Protocol telephony , Basic email, Web browsing - (simple sites), Streaming music, Low quality video (highly compressed)
1 Mbps – 5 Mbps	Web browsing (complex sites), Email (larger size attachments), Remote surveillance, IPTV-Standard Definition (SD) (1-3 channels), File sharing- (small/medium), Digital broadcast video)1 channel), Streaming music.
5 Mbps – 10 Mbps	File sharing (large), IPTV-Standard Definition (multiple channels), Broadcast Standard Definition video, Video streaming (2-3 channels) High Definition video downloading.
5 Mbps – 10 Mbps	Medical file sharing (basic), Remote diagnosis (basic), Remote education, Building control and management.
10 Mbps – 100 Mbps	Telemedicine, Educational Services, Broadcast video SD and some High-Definition, High quality tele-presence, High Definition surveillance, Smart-Intelligent building control.
100 Mbps – 1 gbps	High Definition telemedicine, Multiple Educational Services, Full High – Definition Broadcast video, Full IPTV channel support, High Definition – Video on Demand. Gaming (immersion).

Source: California Broadband Task Force, the State of Connectivity; Building Innovation through Broadband, Jan 2008.

Comparison of standard application speeds compared to CAG's average county speeds.

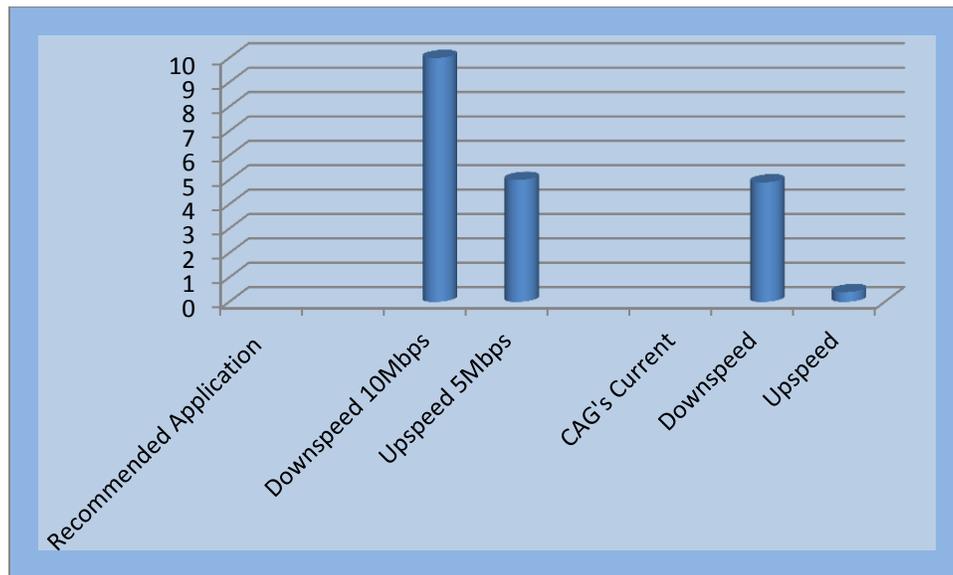


Figure 2

Figure 1: Shows the recommended speeds necessary to support Economic Development, Education, Telemedicine and Public Safety. **CAG's speeds are not sufficient to support the recommended application speeds.** A letter released from Superintendent of Public Instruction, John Huppenthal recommends a speed standard of 6Mbps Down and Up for students at school and at home. Huppenthal's letter is on page 46.

The CAG region seeks to enable the availability of sufficient digital capacity for each of the four applications and an effective redundant system to protect and secure all entities from outages, either natural or manmade.

Arizona also lacks wide area interconnected fiber-optic rings to create robust statewide digital connections. Many communities are essentially stranded islands of digital capacity lacking fail-safe redundancy and inadequate backup in emergencies. There have been numerous Arizona communities that have experienced prolonged broadband Internet and 9-1-1 outages resulting in millions of dollars in economic damage. Ideal digital infrastructure is constructed in rings or interconnects so if there is a cut in the line, the system can route traffic in other directions. (Data Site Consortium and International Research Center, 2009, p. 50).

Some of the CAG regions in this analysis do not have the redundancy to support their networks in the event of a line disruption.

Each CAG region along with its communities has identified the general requirements for additional broadband capacity.

OBJECTIVES

GILA COUNTY

- **Payson:** Broadband distribution at the community level to increase the current capacity and reach more businesses and families. Entrepreneurial home-based businesses are an indicator to the demand and presence of the internet for small business sustainability. There are a significant number of self-employed people in the Payson region.

PINAL County

- **Sun Corridor Megapolitan:** Arizona's Sun Corridor examines Arizona's Sun Corridor as one of 20 'megapolitan' areas in the U.S. and offers a bold new picture of Arizona's geography and its future opportunities and 'megaton' challenges. Arizonans have predicted for 50 years that Phoenix and Tucson would grow together into a giant desert conglomerate. That possibility has been seen as exciting, intriguing, and distressing. While a solid city along Interstate 10 is unlikely given the diverse land ownership in central and southern Arizona, the two metro economies are already merging. **Publisher(s):** Morrison Institute for Public Policy.

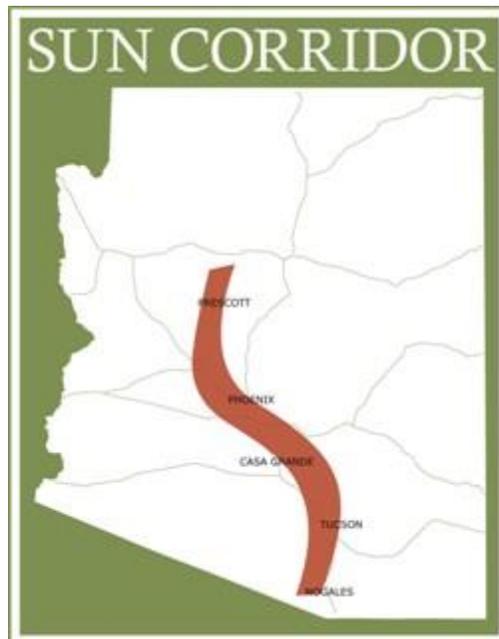


Figure 3

Base Industries in the CAG Region:

- **Casa Grande:** represents the hub of the Sun Corridor between Phoenix and Tucson.

Its economic base is a mix of retail trade, factory outlet shopping, manufacturing and agriculture. This is the central community along the Sun Corridor. Broadband is essential for businesses, schools, healthcare and public safety in this location.

- **City of Maricopa:** manufacturing, retail and construction. The City of Maricopa is a growing city and will require broadband to help prevent the population from moving to metro-Phoenix.
- **Superior:** Better broadband will retain and attract new businesses. Light manufacturing, and tourism with Internet connectivity will assist in driving the economy.
- **Copper Corridor Region:** Creating careers that start with knowledge obtained from Central Arizona College and the regional Business Success Center, funded by USDA and Pinal County is critically important. The emphasis is to retain youth and provide employment to sustain economic development. The San Carlos Apache Tribe is planning a casino near the community of Dudleyville, Arizona. The purpose is to draw north Tucson residents. Upon final completion (2016) there will be 400 employees, and a CAPEX project exceeding \$ 30M.

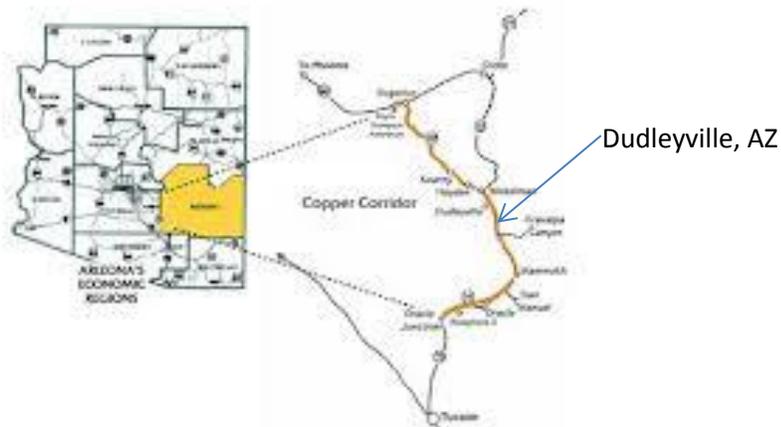


Figure 4

This project has the potential for a major broadband program and could include SB1402 with community connectivity to micro-wave towers. Below is a table of current providers to Dudleyville, AZ.

Provider	Service Type	Advertised Download Speed	Advertised Upload Speed	Download Speed Tier	Upload Speed Tier
Century Link	DSL (Asymmetric)	3 - 6 Mbps	200 - 768 Kbps	5	2
CopperNet	Fixed Wireless	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3
Sprint Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2
Verizon Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2
AT&T Mobility	Mobile Wireless	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3
StarBand Communications	Satellite	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2
HNS (Hughes, Echostar)	Satellite	3 - 6 Mbps	200 - 768 Kbps	5	2
ViaSat (WildBlue)	Satellite	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3

Local leadership is essential in accurately defining broadband requirements. The community action plans for satisfying the identified requirements will lead to model projects for the communities.

The driving force for each of these communities will be to obtain the high-speed Internet technology and infrastructure in place to support the following four applications:

1. **Foster local Economic Development** by:
 - a. retaining and expanding the current businesses
 - b. attracting new businesses,
 - c. providing local Jobs and developing new skill-sets necessary to increase employment and community sustainability.
 - d. Supporting local entrepreneurs who engage with the global economy using high-speed Internet
2. **Improve educational success** within local communities by:
 - a. Increasing the effective use of interactive digital learning solutions such as:
 - i. khanacademy.org,
 - ii. distance learning and collaboration in classrooms, homes and businesses for students of all ages,
 - iii. real-time accountability for student and staff performance.
3. **Improve health care availability**, quality while lowering costs by:
 - a. Using high-speed Internet for local doctors and providers to collaborate with remote specialists
 - b. Improving local triage to reduce unnecessary transportation of patients to remote facilities.
 - c. Providing remote well-being check-ups from local facilities such as schools, libraries, etc.
 - d. Providing enhanced in-home care with video check-ups by remote health care providers
4. **Improve public safety and save lives** by delivering accurate real-time data to all first-responders as needed and across jurisdictional boundaries.

Introduction to the Business Case Analysis

The work performed within the two counties to assess the inventory of currently available broadband services can be summarized as creation of speed tests, Community Data Sets and integration with the Digital Arizona broadband map. Results of this work are:

1. the reporting on speed tests performed speedmatters.org as organized by county/zip code including the identification of service providers and their offered services,
2. the identification of potential grants that that could be applied for to support increased availability and/or more effective use of high-speed Internet in local communities,
3. the creation of a Broadband Development sub-committee within CAG's Economic development and Planning Committee,
4. the ranking of the importance to different communities of different Internet applications based on a particular regions' priorities
5. the creation of web page updates about broadband activities within each region.

By determining not only the current availability of digital services within the two counties, and creation of a composite picture of the community's demographic and socio-eco makeup, the Broadband Development Committee will be able to generate the rationale for why and where additional digital capacity and services are most needed within the various regions. This information can provide fundamental guidance in the process of planning for how to get capacity and services enhanced more effectively and efficiently.

To recognize where CAG needed to place emphasis on broadband capacity, it was necessary to first determine what is currently available within CAG's territory. CAG is comprised of two counties covering central and north-central Arizona. The two counties consist of 10,169 square miles.



Investigative research toward demands on economic development, education, telemedicine and public safety within each region/community, discovered that the CAG region requires enhanced broadband services to attract and sustain economic development programs (jobs, education/skill-sets, regional educational, medical, and public safety services). Several current data resources were utilized to determine the existing digital capabilities for targeted regions. The two county demographics and average broadband speed tests are identified on the following pages.

Speed tests by speedmatters.org and County demographics

Gila County	Tests	Download	Upload
	44	3.2Mbps	.5Mbps

Area:	4,795 sq. miles
County Seat:	Globe
Population:	53,597 (2010)
Unemployment:	10.4% (2009)
Age Groups:	Under 18 years – 22.8% 65 years and over – 22.4%
High School Graduate or higher:	83.5%
Homeownership:	77.8%
Per capita income:	\$19,054 (2009)
Median household income:	\$36,764 (2009)

Pinal County	Tests	Download	Upload
	190	6.6Mbps	.2Mbps

Area:	5,374 sq. miles
County Seat:	Florence
Population:	382,992 (2011)
Unemployment:	8.3% (12/2012)
Age Groups:	Under 18 years – 26.5% 65 years and over – 13.8%
High School Graduate or higher:	83.3%
Homeownership:	72.8%
Per capita income:	\$21,526 (2009)
Median household income:	\$48,851 (2009)

Source: <http://census-statistics.findthedata.org/l/110/Pinal-County-Az>

These speed results by counties indicate each of the two counties is below the FCC benchmark, (4Mbps Down and 1Mbps Up) and below the 10Mbps Download and 5Mbps Upload to adequately support the four applications (economic development –Jobs, education, telemedicine and public service).

Although the quantity of speed-tests performed to date does not rise to the level of statistical significance, the early results point to the fact that the two counties are below the minimum FCC benchmark, (4Mbps Down and 1Mbps Up) and nowhere near the Educationally Sufficient benchmark of 6 Mbps (up and down) established by the State Superintendent of Education. In the near future statistically significant speed test measurements will be created for CAG to use in its planning as broadband users throughout the State report speed-test measurements using the Digital Arizona Speed Test. <http://digitalarizona.gov/>

Gila and Pinal counties currently experience high unemployment rates as seen in the above tables. Casa Grande located in Pinal County, attracts businesses, and has recognized health-care programs. The Copper Corridor developed more skill-set training programs with the high-schools and Central Arizona College (CAC) to help reduce the unemployment and “brain drain”. Interactive video curricula and distant learning capabilities for specialized training would significantly accelerate this process. Payson in Gila County, also attracts small businesses, and currently has distance learning programs, in collaboration between Eastern Arizona College (EAC) and Northern Arizona University. The entire CAG region includes a high number of entrepreneurs and home-based business operators where high-speed digital connections are a necessity to run their small businesses.

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. The data analysis details the speeds and services by zip codes for the two CAG counties. Speedmatters.org is the source for the average speeds reported for each of the two counties and zip codes. The service providers and their services were obtained from the Arizona Broadband Map. The additional small sample of regional and community speed tests for specific anchor institutions were (and will continue to be) conducted via the Arizona broadband Speed Test: <http://www.digitalarizona.gov/Survey/StandardInArizonaQuestion.html>

The Community Planning tasks contributed to the Business Case by providing research (speed tests, provider services in the counties), along with a variety of research methods including surveys, site visits, and focus group updates (multiple presentations during the CAG Economic Development Council meetings) on the Arizona Digital Program (DAP).

From the research activity, (service providers and services, speed results in the two CAG counties and Community Data Sets) root causes of problematic systems were identified.

Current available infrastructure in the regions/communities is in the form of utilities, providers, roads/rails, and is identified in the Arizona Broadband Map with its Community Data Sets. The results can be seen in the Appendix C and D pages 26 - 28.

There is an overwhelming desire by CAG to enhance the current broadband network throughout its regions. In order to adequately address the problems and promote workable, cost effective solutions a Systems Requirement outline was generated. The format identifies the Project, the User Requirements, a description of the tasks required tasks including Environmental Requirements, Constraints, Functional Requirements and Major Milestones. It concludes with an Action Plan. A proposal of what is required to meet the requirements for standard and above broadband capacity has been prepared to support the four major applications, see the Systems Requirement pages 16 – 17 and page 25.

The use of real-time video streaming and collaboration is emerging as the major driver of the need for increased digital capacity. Although consumers are largely seeking this capability to enjoy Internet based video entertainment. (Netflix, etc); the important and live transforming uses are for enhanced educational, health-care, and public safety outcomes, as well as keeping local companies connected and competitive to the global economy. New infrastructure and expanded services offered by providers should be designed to deliver at least 6 Mbps up and down per simultaneous video streaming user on any given Internet connection to make such uses work reliably. The four major applications that define CAG’s business requirements are listed below:

Applications (Priority) as defined by CAG’s Sub-Committee

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

Survey results as of 2/8/2013

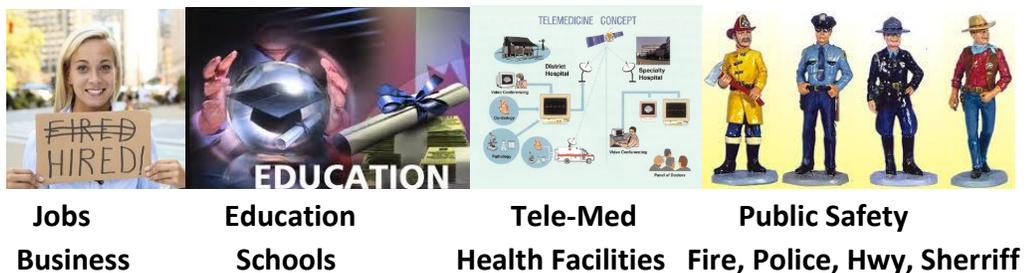


Figure 5

Systems Requirements – A business case to achieve enhanced broadband

1. Project Description - Goals/Objective(s) – “Provide Better Internet Service to rural Arizona citizens, businesses and government”.

2. User Requirements - these requirements are focused on the Four Major Applications and accountability:

A. Economic Development (Jobs)

B. Education – expansion of distance learning

C. Telemedicine – use technology to enhance quality-of-life for rural residents

D. Public Safety – delivery of real-time information to all first responders

3. Identifying the costs of expanding broadband capacity

Right-of-way and environmental requirements

Utility clearances as well as completion of environmental / cultural impact studies.

Regions and local communities can have significant positive impact on the return-on-investment (ROI) calculation to facilitate and encourage such investments by providers.

4. Project Planning Requirements:

- Develop specific action plans, including assignments and schedules (milestones), to meet the goals/objectives of identified projects.
- Communicate with potential investors in desired projects to discover in detail the barriers that might prevent them in investing in an identified project.
- Explore ways to mitigate possible barriers through 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.

5. Identify and agree upon major milestones and expected accomplishments and how success will be measured.

- Leadership and Planning are essential for the success of any project.
- Identify the leaders and advocates in each community for each project
- Communicate with all leaders in the community and leaders in other communities frequently to learn about best practices and keep the project momentum high.
- Track progress and corrective actions that may need to be taken

6. Desired Outcomes:

Initially Targeted CAG Communities:

Payson - will be creating a plan for effective broadband distribution. The current facilities will be assessed for digital infrastructure improvement requirements and there is planning for provider and community aggregation to meet the objective of local distribution.

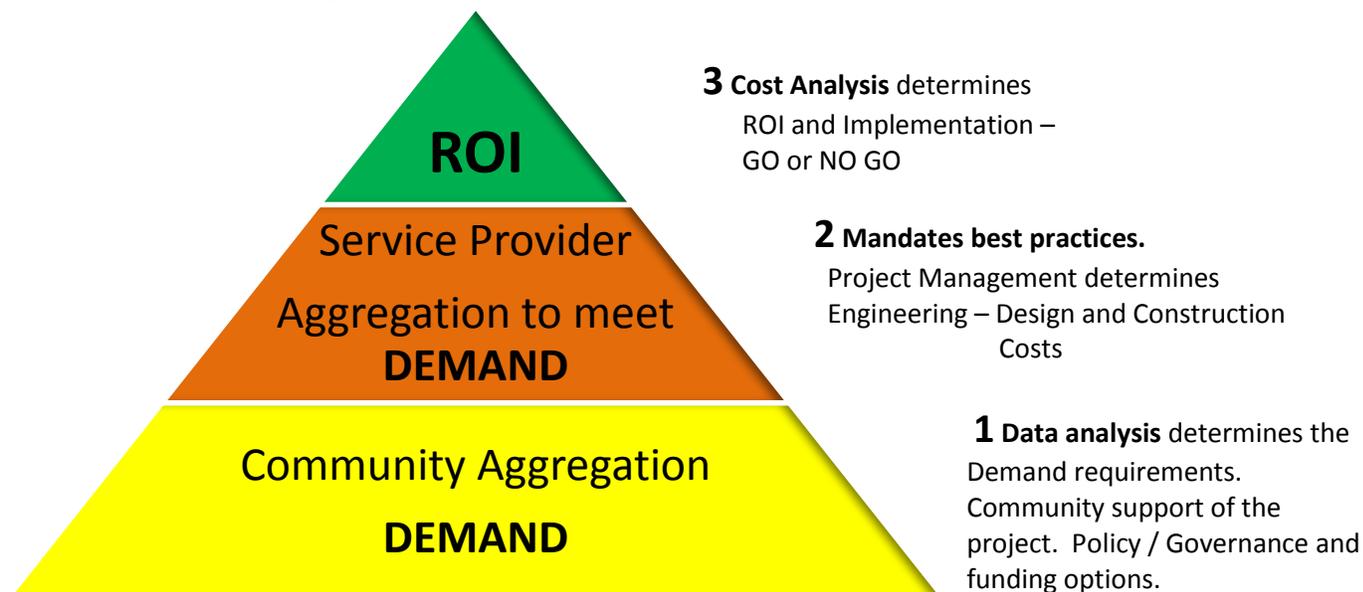
Sun Corridor – seeks more capacity to support the attraction of new businesses including manufacturing and UPRR’s Red Rock Transfer station with 300 new employees. New road and power-line construction will be evaluated as a potential for new conduit/fiber last-mile routes by working with Pinal County’s Economic Development organization.

Copper Corridor - The San Carlos Apache Tribe is developing a casino near Dudleyville, AZ. Discussion with the tribe and Pinal County has begun and will continue with planning, provider aggregation with the tribe’s telecom, and community development. Resolution Copper Mine will begin operations upon approval of proposed land swaps. This mining operation is dependent on new technologies and skill set demands within the region. Broadband is essential for the operation, including training, and connectivity to global mining operations.

Casa Grande – is the largest community in the region and requires expanded broadband capacity for their current, as well as future, employers. There are two intersects: I-80 and I-10 for direct routes to Phoenix, Tucson, San Diego and Los Angeles for distribution of goods.

City of Maricopa – supports manufacturing, retail and agriculture. Many residents live here but work in southern Phoenix. They are dependent on the internet for business, education and welfare.

REGIONAL DEMAND AGGREGATION....



Community aggregation means the inclusion of stakeholders (business, government, residents) to quantify a greater demand for broadband services. Communities may look for funding streams to offset a portion of the costs to private investors.

Service provider aggregation means sharing capacity between providers and offsetting costs. Design and construction costs can be lowered with funding streams (revolving loans, Community Reinvestment Act (CRA), USDA Broadband projects and/or making community physical assets and ROW available at or near cost).

A Return on Investment for the provider(s) and community will insure success and sustainability. There are two possible locations for provider aggregation. One location is Payson, where local distribution of broadband is one of the town's major requirements.

- Provider aggregation could consist of Frontier and CenturyLink partnering with other local providers to provide the service.
- The Casa Grande region is a prime location for attracting new businesses because of its connection to I-10 and I-8. It is recognized as the hub between Phoenix and Tucson and a key element of the Sun Corridor.
- Work has begun with the San Carlos Apache Telecommunications Utility (SCATU) and Pinal County for additional broadband capacity to support a casino (2013 – 2014) with the possibility of a hotel (2016) and up to 400 employees.

The research approach included a purposeful sampling of broadband capacity in CAG's two counties, representing 10,169 square miles, and 14% of the total population of the state and about 43% of Arizona's rural population. Arizona is in strong competition with California, Texas,

Utah, and Nevada for business. After site selectors find a location and after inquiring about utilities they ask if there is high-capacity service in the area. The stakes are too high to continue “business as usual”. Rural Arizona must look forward to providing improved infrastructure to support businesses, provide education and protect its residents and properties with reliable and cost effective systems.

Investments must be made in the CAG 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. Casa Grande will become a manufacturing and distribution center serving warehousing tenants along the Sun Corridor. These companies rely upon high capacity broadband to service their customers and efficiently run their businesses. Mining on the eastern portion of Pinal County will require skill-sets that meet the demand of the employers. Gila County will focus on small businesses and entrepreneurs, and broadband connectivity to customers and vendors is essential. Without the Internet, these communities would not be able to brand and market their assets to the rest of the world.

Rural Arizona needs to vigorously prepare for increasing broadband infrastructure, whether it includes the middle-mile and/or local distribution in regions/communities.

Arizona's Councils of Governments Map



Figure 6

Figure 6. There are four rural Council of Governments (COGs) in Arizona.

Arizona is 113,000 square miles of geographical contrasts. The Central Arizona Governments (CAG) region consists of two counties, Gila and Pinal. The estimated total population in 2012 for the CAG region is 436,589.

The other three rural COGs are Northern Arizona Council of Governments (NACOG) covering Apache, Navajo, Coconino and Yavapai counties, Western Arizona Council of Governments (WACOG) covering Yuma La Paz and Mohave counties, and the Southeastern Arizona Council of Governments (SEAGO) covering Santa Cruz, Cochise, Graham and Greenlee counties. The two primarily urban COGS are the Maricopa Association of Governments (MAG) and the Pima Association of Governments (PAG). Neither of these two latter COGs is rural.

Appendix A

1. Preparation of the Business Case Analysis

I. Work with the two identified counties to assess inventory of broadband services and infrastructure currently available.

The first step was to engage CAG's Executive Team. This was accomplished by meeting with the CAG team and obtaining their endorsement. The next step involved presentations to the CAG Economic Development Council and getting their buy-in. Once there was commitment the inventory of available broadband providers and services and infrastructure was documented.

- Broadband Services and speeds per each of the two counties identified.
- Broadband Providers and Services per designated community (identified within the two counties) were identified.
- Periodic updates provided to CAG.
- Broadband maps and CAG's Transportation Department identified routes and locations where infrastructure assets are currently available and where there are opportunities to increase digital capacity.

II. The inventory of broadband services and infrastructure has been obtained through a variety of resources including data sets linked to the Digital Arizona Broadband Community Planning Map, www.digitalarizona.gov. A total of twenty communities within the two counties were analyzed, including available broadband providers and their reported service speeds based on data from the map. The inventory of such data resources included:

- Extraction of Broadband Providers and Services from the Arizona Broadband Community Planning Map. There are at least 17 service providers in the CAG region.
- Demographic data from city-data.com, census data, Department of Economic Security, ReferenceUSA, Arizona Department of Transportation and the Arizona Commerce Authority. This data provided actual services to communities and regions. References can be seen on pages 28 - 29.

III. A Systems Requirement document has been prepared. The foundation of the document uses the above inventory of current broadband services to identify digital 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. The general Systems Requirement document can be viewed on page 25. Key ingredients for the Systems Requirement document include:

- Project Description with Goals and Objectives

- User Requirements: Response to the four major applications and how additional broadband capacity can better serve the region/communities.
- Environmental Requirements, including Right-of-Way and clearances.
- Constraints include commitment and aggregation of community leaders and providers, infrastructure costs, and Return-On-Investment.
- Functional Requirements include an action plan to:
 - Separate the “Must Have” from the “Like to Have” projects
 - Support the four applications with 10Mbps Download and 5Mbps Upload speeds.
- Identify major milestones and Expected Achievements.

IV. Analysis of potential demand aggregation and its incentive values for private sector broadband investment in each region is identified in the speed and provider tables located in Appendix F, pages 30 – 35. The analysis also includes:

- Identification of Service Providers and Services by regions and communities. Currently, there are 17 providers covering the two counties and communities identified in CAG’s two counties.
- Provider and community aggregation has begun in the Town of Clarkdale with cell tower planning/zoning and permitting processes with AT&T and the community.

V. A survey to gather data to be utilized in generating a report on current adoption of broadband services by educational and healthcare entities, businesses and private citizens includes expectations and desired levels of broadband capacity and services. Conducted surveys with the CAG Sub-Committee and community representatives identified:

- The ranking of the applications and desired levels of broadband capacity and services include:
 - **Payson** – local broadband distribution at a reasonable cost for residents and businesses.
 - **Dudleyville** – San Carlos Apache has obtained Pinal County Resolution to build a casino ½ mile to the east of SR 77 and east of Dudleyville. Planning meetings for provider and community/county aggregation are in process.

Potential Projects:

- **UPRR** – Union Pacific Rail Road is planning on having a 74 track transfer yard located north of Marana, east of I-10. This is a \$300M project with an expected head count of 300 employees. The project is dependent on land exchanges, but should it occur there will be interactions with ADOT, APS, Pinal County, CAG, UPRR and broadband service providers.

- **Superior** – Resolution Mining has conducted engineering inspections to determine that one of the world’s largest copper deposit is within reach. This project is dependent upon land exchange and congressional approval. When the mine is operational it will employ more than 3,700 and generate \$20B in tax revenue. Needless to say, broadband will be essential to its operation.

Pending the review of the technical assistance gap analyses there may be opportunities for grants with USDA RUS, and USDA RBEG. ROW Clearance for the San Carlos Apache’s casino in Dudleyville could serve as the analysis/template for a rural town. The template could be used for other jurisdictions, and technical analysis for broadband development projects in specific areas.

2. Grant opportunity Identification

The Arizona Broadband Community Planning Map, the Community Data Sets and the benchmark speed tests become the ingredients for potential broadband demand aggregation. A survey distributed to the CAG Sub-Committee also serves as Key Performance Indicators. Broadband infrastructure deployment will be based upon demand and sometimes urgencies. A generous list of grants that have potential broadband leverage can be found in Appendix G, pages 36 – 39.

3. Broadband Committees

The CAG Broadband Subcommittee was organized during November and December of 2012. The committee has held two official meetings, one in person and one by conference call. There have also been a number of email communications. This subcommittee is organized under the Economic Development Committee of CAG.

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 this survey and feedback regarding the need for improved broadband in the two counties of CAG. Key stakeholders and their motivation for better broadband are listed below:

- Tim Kanavel – Pinal County Economic Development Director who is foremost concerned with the broadband for economic development – Jobs.
- Al Larson – Interim Executive Director of Central Arizona Governments (CAG) is concerned with the need for broadband infrastructure for business retention and attraction.
- Andrew Clegg – past Economic Development Manager (CAREDF) is concerned about Jobs and Education.

The input received from the above stakeholders provided the key objectives for each of the two counties.

Key Objectives: The Sub-Committee will indicate the priority levels of the four applications. They will provide direct interface with anchor institutions and operators. They will contribute to providing financing partnerships among the service providers and the communities, relative to broadband infrastructure. Already work has begun with the San Carlos Apache Tribe' casino in Dudleyville, AZ.

4. Broadband focused Webpage(s)

Publications of pages occurred during the initial planning stages. Periodic updates have been provided and CAG has included in their website. These pages include community involvement and items of interest (SB1402 and SB1353), relating to the Digital Arizona Program and activities the Sub-Committee are conducting. These updates can be seen in Appendix I, pages 41 - 45.

Appendix B

Systems Requirements

1. Project Description - Provide Better Internet Service to rural Arizona citizens, businesses and government.

2. User Requirements - Ranking of the four major applications identifies community/regional requirements. Speed tests conducted on the two counties including the zip codes for the two counties indicate that the counties/regions data speeds are below the FCC benchmarks. User requirements indicate a demand for more broadband capacity.

3. Developmental Requirements:

- Property ownership and clearances where required
- Right-of-Way clearances
- Environmental & Cultural clearances
- Property Ownership
- Community-wide Demand Aggregation
- Service Provider infrastructure sharing (aggregation)
- Interfaces with current infrastructure
- Safety requirements
- Redundancy requirements

4. Constraints:

- Stakeholder commitment
- Service Provider commitment
- Processing capabilities compared to projected costs
- Return-On-Investment
- Infrastructure
- Hardware and Software integration
- Project Budget
- Terrain

5. Functional Requirements:

- Action Plan with Task Assignments and Schedule
- The anticipated speeds to support the four applications consist of:
 - 10Mbps Download Speed : 5Mbps Upload Speed
 - As can be seen on page 7, California Speed Tests
- Resources: communities, service providers, technical assistance
- Determine: the “Must Have” vs “Like to Have” program(s)

6. Major Milestones and Expected Achievements:

- Leadership and Planning is essential for the success of the project.
- Funding: grants, foundation, Community Reinvestment Act (banks).

Appendix C

Digital Arizona Broadband Map

The link <http://broadbandmap.az.gov/CommunityPlanningMap/> contains the state broadband map funded by a federal grant along with the associated data sets.

This broadband map is updated twice a year over the five year period of the federal grant funding which ends in December of 2014.

Overlays of economic, employers, jobs, population and other demographics have been added to enhance the use of the map as a tool for broadband planning and technical analysis. Arizona's map has received attention on the national scene for these innovations.

This broadband map is interactive and available to any individual or organization free of charge through the web link above.

The following pages illustrate the Arizona Broadband Map, followed by the integration of the Community Data Sets.

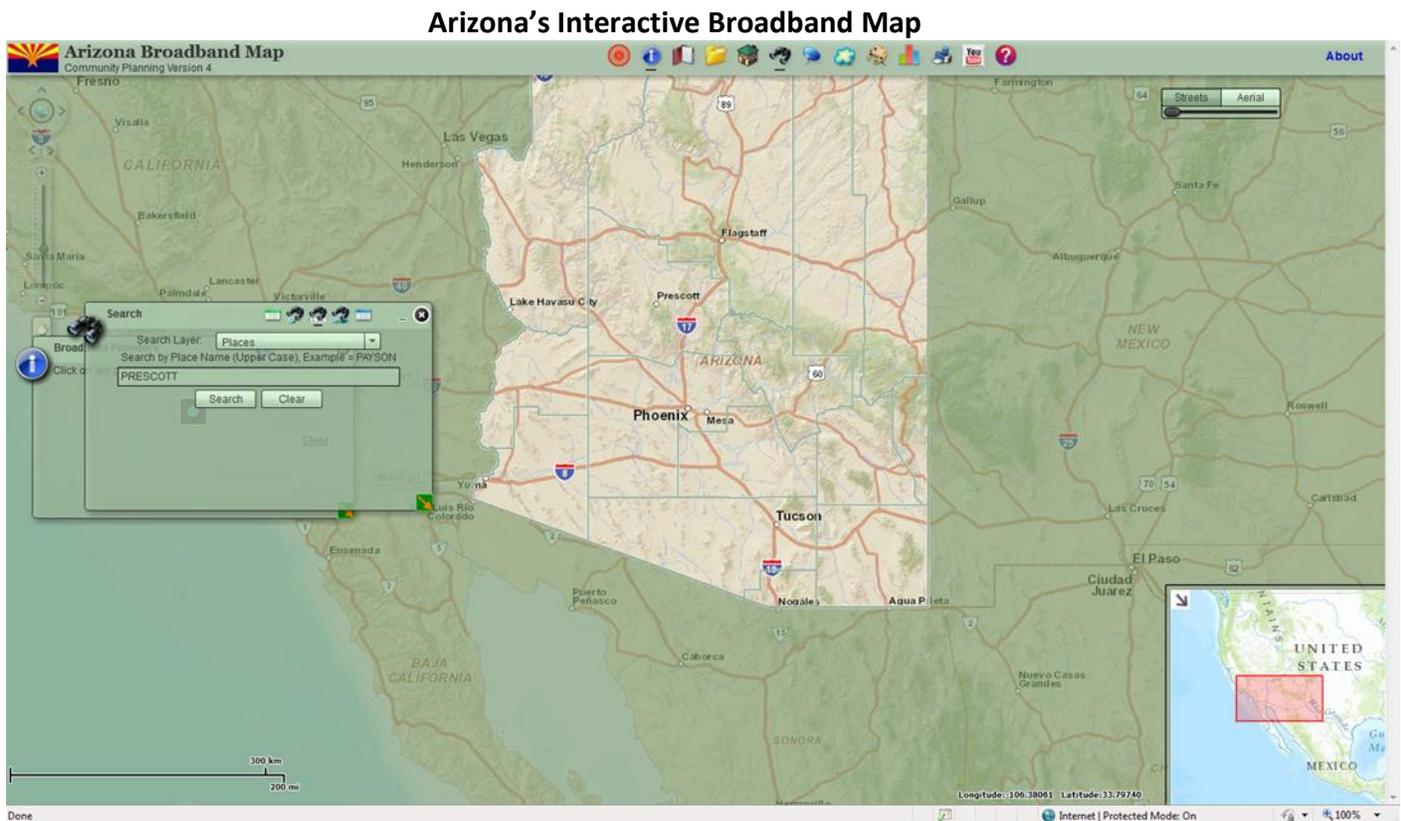


Figure 7

Arizona Broadband Map Community Planning Functions and Features

- Multiple search capabilities
 - County, Community, Provider and Services, Routes, Schools, Libraries, Congressional Districts, Land Ownership (State, Federal, Tribal), etc.
- Display of Community Anchor Institutions (CAIs)
- Interstate highways
- Providers and Providers' Services
- Counties, Communities
- Links to Socio-Eco data
- Links to Community Data Sets

Appendix D

Screenshot example of Community Data Sets profile information:

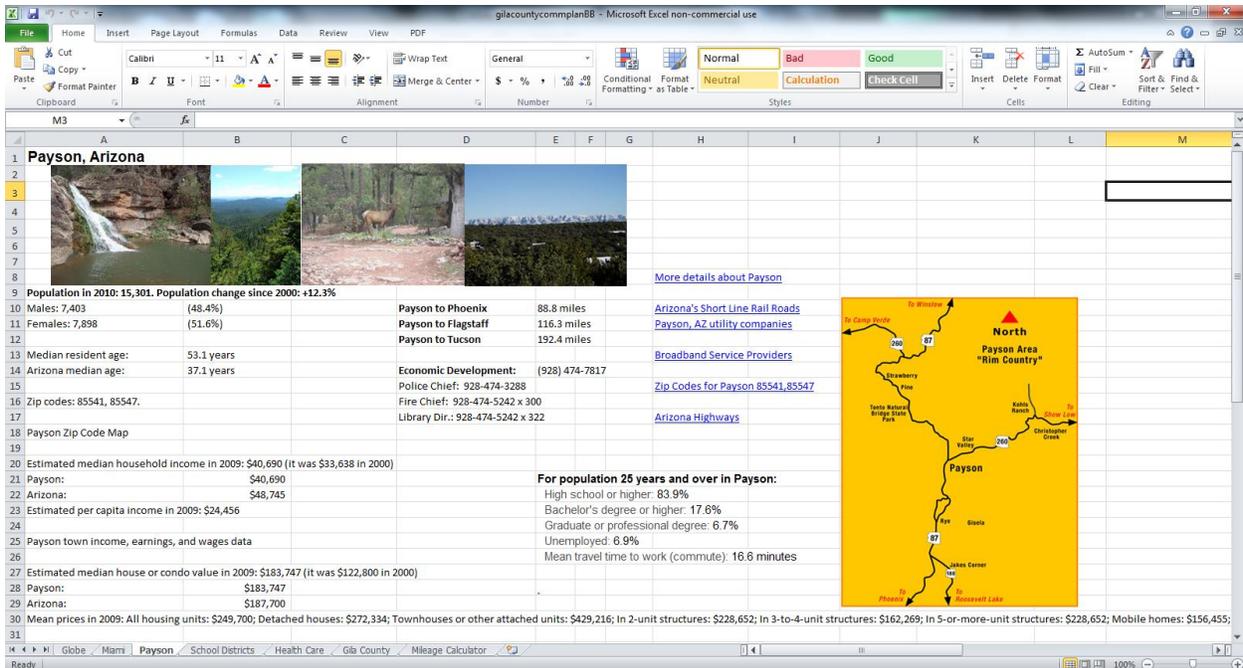


Figure 8

The Community Data Sets offer detail information about a community. This data is essential for developing broadband plans and system implementation. Data sets consists of:

- Details about the community include population, gender population, median resident age, Arizona's median age, zip codes, map with SR Highways, unemployment rate, estimate median household income, median cost of home, population 25 years and over with educational levels, major employers and occupations.
- Additional pages include the County to Arizona statistics, mileage chart for configuring miles between CO's and Last mile demarks, Arizona Highway Map, Arizona Rail Road Map for potentially running fiber along short line and two Class One rail lines, utility companies for towers and underground power, school districts, and healthcare clinics for locations (addresses, broadband service and contact information).
- Links to local Service Providers including Down Load, Up Load speeds, services and speeds relative to the communities: Employers (jobs), Education (schools), Healthcare (telemedicine) and Police/Sheriff (public safety).

Specific data comparisons are in the next section on Community Data Sets.

Appendix E

Sources of Reference Material

Sources*:

- U.S. Census Bureau:
www.censusrecords.com
- State and County QuickFacts
<http://quickfacts.census.gov/qfd/states/00000.html>
- Data derived from Population Estimates
<http://quickfacts.census.gov/qfd/states/00000.html>
- American Community Survey
<http://www.census.gov/acs/www/>
- Census of Population and Housing
<http://quickfacts.census.gov/qfd/states/04000.html>
- State and County Housing Unit Estimates
<http://www.census.gov/popest/data/housing/totals/2011/HU-EST2011-3.html>
- County Business Patterns
<http://www.census.gov/wholesale/index.html>
- Non-employer Statistics
<http://www.census.gov/econ/nonemployer/index.html>
- Economic Census
http://www.census.gov/econ/census/new_for_2012.html
- Survey of Business Owners
<http://www.census.gov/econ/sbo/>
- Building Permits
http://www.CAG.org/index.cfm?fuseaction=dep_intro&dept_id=6

Appendix F

Explanation of broadband speed tests:

Upstream speeds of 5 Mbps and Downstream speeds of 10 Mbps as seen in the chart on page 7 will meet the following applications recommended desirable broadband speeds: Medical file sharing (basic), Remote diagnosis (basic), Remote education, 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.***



Current and Future Broadband Speed Standards:

The minimum current FCC broadband speed standard is 4 megabits per second (Mbps) download, and 1 Mbps upload.

Arizona State School Superintendent John Huppenthal in a March 7, 2012 letter released to the public 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.” **It turns out that telemedicine, enhanced public safety and most modern business applications require equivalent levels of performance.**

Mr. John Huppenthal, Superintendent of Public Instruction, letter can be viewed on page 46 .

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.”

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.”

<http://www.broadband.gov/plan/2-goals-for-a-high-performance-america/>

Using the FCC minimum speed definition for broadband – in many cases, rural Arizona communities cannot meet this minimum definition.

Speed tests by counties/zip codes with Service Providers by speedmatters.org:

Gila County 44 tests, 3.2Mbps Download and .5Mbps Upload speeds

Zip Code	Down Load Speed (Mbps)	Up Load Speed (Mbps)
85292	6.6	.8
85501	4.9	.5
85539	6.0	1.0
85541	5.34	.7
85545	.5	.049
85941	.8	.1

Gila County

General - Regional Service Providers

Provider	Service Type	Advertised Download Speed	Advertised Upload Speed	Download Speed Tier	Upload Speed Tier	Globe	Miami	Payson
Century Link	DSL (Asymmetric)	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X		X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	200 - 768 Kbps	5	2	X		X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3	X		X
Century Link	DSL (Asymmetric)	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3	X		X
Century Link	DSL (Asymmetric)	10 - 25 Mbps	768 Kbps - 1.5 Mbps	7	3	X		X
Century Link	DSL (Asymmetric)	25 - 50 Mbps	3 - 6 Mbps	8	5	X		X
Century Link	DSL (Asymmetric)	25 - 50 Mbps	10 - 25 Mbps	8	7	X		X
Century Link	DSL (Asymmetric)	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X		X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	200 - 768 Kbps	5	2	X		X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3	X		X
Century Link	DSL (Asymmetric)	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3	X		X
Century Link	DSL (Asymmetric)	10 - 25 Mbps	768 Kbps - 1.5 Mbps	7	3	X		X
Century Link	DSL (Asymmetric)	25 - 50 Mbps	3 - 6 Mbps	8	5	X		X
NPG Cable (Suddenlink)	Cable	10 - 25 Mbps	1.5 - 3 Mbps	7	4	X		X
NPG Cable (Suddenlink)	Cable	10 - 25 Mbps	1.5 - 3 Mbps	7	4	X		X
Wydebeam	Fixed Wireless	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4	X		X
CommSpeed	Fixed Wireless	768 Kbps - 1.5 Mbps	768 Kbps - 1.5 Mbps	3	3	X		X
Sprint Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X	X	X
Verizon Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X	X	X
AT&T Mobility	Mobile Wireless	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X	X	X
StarBand Communications	Satellite	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X	X	X
HNS (Hughes, EchoStar)	Satellite	3 - 6 Mbps	200 - 768 Kbps	5	2	X	X	X
ViaSat (WildBlue)	Satellite	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3	X	X	X
SRP	Fiber	> 1 Gbps	> 1Gbps	11	11		X	
Cable One	Cable	50 - 100 Mbps	1.5 - 3 Mbps	9	4		X	

Pinal County

190 tests, 6.6Mbps Download and .2Mbps Upload speeds

Zip Code	Down Load Speed (Mbps)	Up Load Speed (Mbps)
85219	6.8	.7
85222	23.9	.9
85228	1.7	7.8
85232	7.3	.7
85239	9.0	1.0
85242	5.5	1.3
85292	6.6	.8
85539	6.0	1.0
85623	6.0	.7
85631	5.6	.7
85653	4.9	2.1
85739	5.6	7.5

Pinal County

Provider	Service Type	Advertised Download Speed	Advertised Upload Speed	Down load Speed Tier	Upload Speed Tier	A p a c h e	S u p e r i o r	K e a r n y	S a n M a n u e l	S a n T a n a	M a r a n a	M a r i c o p a	Casa Grande
SRP	Fiber	> 1 Gbps	> 1 Gbps	11	11	X	X	X		X			
Century Link	DSL (Asymmetric)	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X		X	X	X	X	X	X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	200 - 768 Kbps	5	2	X			X	X	X	X	X
Century Link	DSL (Asymmetric)	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3	X			X	X	X	X	X
Century Link	DSL (Asymmetric)	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3	X		X	X	X	X	X	X
Century Link	DSL (Asymmetric)	10 - 25 Mbps	768 Kbps - 1.5 Mbps	7	3	X				X	X	X	X
Century Link	DSL (Asymmetric)	25 - 50 Mbps	3 - 6 Mbps	8	5	X				X	X	X	X
Century Link	DSL (Asymmetric)	25 - 50 Mbps	10 - 25 Mbps	8	7	X				X	X	X	X
Covad Communications	DSL (Asymmetric)	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X					X		
Covad Communications	DSL (Asymmetric)	1.5 - 3 Mbps	200 - 768 Kbps	4	2	X					X		

Provider	Service Type	Advertised Download Speed	Advertised Upload Speed	Download Speed Tier	Upload Speed Tier	A p a c h e J c t	S u p e r i o r	K e a r n y	S a n M a r a n u e l	S a n T a n	M a r a n a	M a r i c o p a	Casa Grande
Covad Communications	DSL (Asymmetric)	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X					X		
Century Link	DSL (Asymmetric)	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X							
Century Link	DSL (Asymmetric)	25 - 50 Mbps	10 - 25 Mbps	8	7	X							
Covad Communications	DSL (Symmetric)	768 Kbps - 1.5 Mbps	768 Kbps - 1.5 Mbps	3	3	X					X		
Covad Communications	DSL (Symmetric)	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4	X							
Covad Communications	T1/Tn	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4	X							
Covad Communications	T1/Tn	3 - 6 Mbps	3 - 6 Mbps	5	5	X							
TW Telecom	T1/Tn	768 Kbps - 1.5 Mbps	768 Kbps - 1.5 Mbps	3	3	X			X	X	X		X
XO Communications	T1/Tn	6 - 10 Mbps	6 - 10 Mbps	6	6	X				X	X		
Covad Communications	T1/Tn	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4	X					X		
Cox Communications	Cable	50 - 100 Mbps	3 - 6 Mbps	9	5	X				X	X		X
Mediacom Southeast	Cable	10 - 25 Mbps	1.5 - 3 Mbps	7	4	X				X			
Mediacom Southeast	Cable	10 - 25 Mbps	1.5 - 3 Mbps	7	4	X				X			
TruCom	Fixed Wireless	768 Kbps - 1.5 Mbps	768 Kbps - 1.5 Mbps	3	3	X				X			
Wydebeam	Fixed Wireless	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4	X				X			
CopperNet	Fixed Wireless	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3	X	X	X	X	X			
Western WiMax	Fixed Wireless	6 - 10 Mbps	6 - 10 Mbps	6	6	X							
Leap Wireless (Cricket)	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X					X	X	X
Sprint Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X			X		X	X	X
Verizon Communications	Mobile Wireless	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X	X	X	X		X	X	X
T-Mobile (Deutsche Telecom)	Mobile Wireless	1.5 - 3 Mbps	200 - 768 Kbps	4	2	X					X	X	
AT&T Mobility	Mobile Wireless	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3	X	X	X	X		X	X	X
T-Mobile (Deutsche Telecom)	Mobile Wireless	10 - 25 Mbps	1.5 - 3 Mbps	7	4	X					X	X	X
Verizon Communications	Mobile Wireless	10 - 25 Mbps	3 - 6 Mbps	7	5	X					X		
StarBand Communications	Satellite	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2	X	X	X	X		X	X	X

Provider	Service Type	Advertised Download Speed	Advertised Upload Speed	Download Speed Tier	Upload Speed Tier	A p a c h e	S u p e r	J c t	K e a r n y	S a n M a n u e l	S a n T a n	M a r a n a	M a r i c o p a	Casa Grande
HNS (Hughes, Echostar)	Satellite	3 - 6 Mbps	200 - 768 Kbps	5	2	X	X	X	X		X	X		X
ViaSat (WildBlue)	Satellite	3 - 6 Mbps	768 Kbps - 1.5 Mbps	5	3	X	X	X	X		X	X		X
Integra	DSL (Symmetric)	1.5 - 3 Mbps	1/5 - 3 Mbps	4	4						X			
Comcast Cable	Cable	10 - 25Mbps	1/5 - 3 Mbps								X			
RuralNet Wireless	Fixed Wireless	1.5 - 3 Mbps	768 Kbps - 1.5 Mbps	4	3						X			
Simply Bits	Fixed Wireless	1.5 - 3 Mbps	1.5 - 3 Mbps	4	4						X			
Transworld Network	Fixed Wireless	3 - 6 Mbps	1/5 - 3 Mbps	5	4						X	X		X
Transcend Broadband	Fixed Wireless	3 - 6 Mbps	1/5 - 3 Mbps	5	4							X		X
Casa Grande Internet	Fixed Wireless	6 - 10 Mbps	768 Kbps - 1.5 Mbps	6	3							X		X
AireBeam	Fixed Wireless	10 -25 Mbps	768 Kbps - 1.5 Mbps	7	3									X
Western Broadband	Cable	10 - 25 Mbps	200 - 768 Kbps	7	2									X
Ygnition	Cable	768 Kbps - 1.5 Mbps	200 - 768 Kbps	3	2									X

Appendix G

Grant opportunity Identification

The Arizona Broadband Community Planning Map, the Community Data Sets and the benchmark speed tests become the ingredients for potential broadband demand aggregation. A survey distributed to the CAG Sub-Committee also serves as Key Performance Indicators. Broadband infrastructure deployment will be based upon demand and sometimes urgencies.

The AZ Broadband Community Planning Map identifies the service providers and their capacities, while the Community Data Sets serve as indicators to the:

- Economic Development (Jobs) – Employers, occupations
- Education - School Districts
- Telemedicine - Health Care Facilities
- Public Safety – police, sheriff, Fire, EMT, Forest departments

Collaboration with funding agencies is essential in developing potential incentive programs. The Arizona Commerce Authority (ACA) has grants and funds to:

Economic Development (Jobs). Public/Private Partnership eligibility.

- Arizona STEP Grant – Cash assistance to help develop international exports. <http://www.azcommerce.com/az-step-grant/>
- Job Training Program – 75% eligible training expenses for net new employees, 50% for incumbent job training. <http://www.azcommerce.com/job-training/>
- Quality Jobs Program – tax credit up to \$ 9,000 per new qualified employee over 3 year period. <http://www.azcommerce.com/quality-jobs/>
- Research & Development – tax credit up to 24% new R&D, \$ 600,000 plus 15% of expenses in excess of \$ 2.5M, 34% of expenses if in conjunction with AZ public university and 75% of excess tax credit can be refunded to small businesses. <http://www.azcommerce.com/research-development/>
- Small Business Capital Investment Tax Credit (Angel Investment) – tax credit up to 35% of investment over 3 years. Elimination of capital gains tax on income from investment in certified companies. <http://es.azcommerce.com/angelinvestment.aspx>

State & Federal incentives for Education, enhancements.

- Arizona Tax Incentive program - This tax incentive provides a State of Arizona income tax deduction for contributions made to any state's 529 plan. The incentive adds to the

ongoing tax benefits of a 529 plan where assets grow tax-deferred and withdrawals are tax-free when funds are used for qualified higher education expenses.

- Married couples can subtract up to **\$1500** when filing jointly
 - Single individuals or heads of household may subtract up to **\$750**
 - Families should consider their own state's 529 plan before investing in another state's plan. By considering in-state incentives, families may find that they more closely meet college saving goals. Families are urged to consult their tax advisor when making a college savings decision. Contact the Arizona Department of Revenue Taxpayer Information and Assistance Section at (602) 255-3381 with questions.
-

Additional Opportunity:

- The Partnership for Assessment of Readiness for College and Careers (PARCC) is a consortium of states working together to develop a common set of K-12 assessments in English and math anchored in what it takes to be ready for college.

PARCC Technology Guidelines

[Version 2.0/December 21, 2012](#)

The document provides minimum and recommended specifications for computer hardware, input devices, and security requirements; and suggests recommended levels of bandwidth that will support schools instructional and assessment needs. It does not yet set minimum bandwidth specifications. Schools, districts, and states can use these guidelines to determine the eligibility of existing computers as test-taking devices for the 2014-15 PARCC assessments.

The information in this document is intended to answer questions about whether computer inventories and new instructional hardware schools may purchase as they implement the Common Core States Standards, will also meet PARCC's 2014-15 requirements for the online test. Smaller tablets (screen size less than 9.5"), e-readers, and smart phones will not be supported and will not be compatible with PARCC assessments for 2014-2015.

BANDWIDTH RECOMMENDATIONS

Minimum bandwidth requirements will be determined based on the final selection of the PARCC assessment delivery platform and the level of multimedia and technology enhanced items in the final assessment design. PARCC will provide minimum specifications by October 2013.

Letter from State Superintendent John Huppenthal regarding needed broadband speeds for education in the classroom and at home can be seen on the following page.

Arizona Ready-for-Rigor Project (TIF- Grant)

The Arizona Ready-for-Rigor Project is a \$43.8 million Teacher Incentive Fund (TIF) grant from the U. S. Department of Education awarded to ASU and its partners for 2010-2015.

This project aims to develop, implement and assess a performance-based compensation system in historically struggling schools for the purpose of increasing student achievement, retaining highly effective educators, and fostering exemplary school culture in the highest-need communities across Arizona. The Arizona Ready-for-Rigor Project is led by Arizona State University's Mary Lou Fulton Teachers College, School Partnership Grant Programs and its Executive Director, [Dr. Virginia McElyea](#).

To view an audio presentation about this project, please click [here](#).

- Arizona Department of Education (ADE) <http://www.azed.gov/>
- National Institute for Excellence in Teaching (NIET) <http://niet.org/>

Telemedicine incentive programs - ACA and USDA are resources for Telemedicine

- ACA's Angel Investment: <http://www.azcommerce.com/angel-investment/>
- ACA's R&D program: <http://www.azcommerce.com/research-development/>
- USDA's Telemedicine and Distance Learning grant – administered in D.C.
- USDA' Rural Utility Service grant: http://www.rurdev.usda.gov/Utilities_Assistance.html
- USDA's Rural Business Opportunity Grant (RBOG):
http://www.rurdev.usda.gov/BCP_RBOG.html
- USDA's Rural Business Enterprise Grant (RBE):
http://www.usda.gov/wps/portal/usda/usdahome?contentid=kyf_grants_rd6_content.html
- USDA's Rural Economic Development Grant (REDG) – requires a community- oriented utility coop willing to apply on the project's behalf. Revolving loan that could be used to offset broadband infrastructure costs.
http://www.usda.gov/wps/portal/usda/usdahome?navtype=SU&navid=RURAL_DEVELOPMENT

Public Safety

- Assistance to Firefighters Grants (AFG): <http://www.firegrants.info/>
- Coordinated Tribal Assistance Solicitations (CTAS):
<http://ncfy.acf.hhs.gov/funding/2013-tribal-justice-safety>
- Edward Byrne Memorial Justice Assistance Grant (JAG):
<http://www.grants.gov/search/search.do?mode=VIEW&oppId=98213>
- AZ Department of Homeland Security: <http://www.azdohs.gov/>
- FEMA: <http://m.fema.gov/>

Grant opportunity identification continued...

Program / Description	Web Site Links
1. Twenty-six (26) grant making agencies	www.grants.gov
2. 2,000 government foundations And corporate funders	www.fundsnetsservices.com
3. Overview of federal & foundation grant makers	www.ecivis.com (annual cost)
4. Private grant makers	www.grantstation.com (annual cost)
5. U.S. foundations and corporate donors – 35,000 foundations, corporate donors, matching gift programs, in-kind donation and government grant makers.	www.foundationcenter.org and www.bigdatabase.com
6. Arizona grant seekers – online searchable data- Base.	www.azgrants.com (annual cost)
7. Center for Rural Affairs – entrepreneurs, energy Efficiency, hiking trails, broadband, etc. Contact:	www.cfra.org/node/1880 briand@cfra.org
8. SBA programs	www.sba.gov
9. Small Business Innovation Research (SBIR)	www.azcommerce.com
10. Economic Development Administration (EDA)	www.eda.gov
11. New Market Tax Credits	http://cdfifund.gov/programs
12. Advanced Technology Program (ATP)	www.atp.nist.gov
13. Dual Use Science & Technology Program	www.acq.osd.mil/ott/dust
14. Department of Energy	www.eere.energy.gov
15. National Science Foundation (NSF)	www.nsf.gov
16. Arizona’s Angel Investment Tax Credit	www.azcommerce.com
17. Arizona’s Research & Development Income Tax Credit.	www.azdor.gov
18. Arizona’s FAST grant	www.azcommerce.com
19. Rural Business Enterprise Grants	www.rurdev.usda.gov
20. Community Development Block Grants (CDBG)	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Appendix H

Broadband Committees

The CAG Broadband Subcommittee was organized during January of 2013. The committee has held two official meetings. And has had several follow-up one-on-one calls with members. There have also been a number of email communications. This subcommittee is organized under the Community Economic Development (CEDs) of CAG.

The Goals of the CAG Broadband Subcommittee and members include:

Goals: The Sub-Committee will indicate the priority levels of the four applications. They will provide direct interface with anchor institutions and operators. They will contribute to providing financing partnerships relative to broadband infrastructure.

Individuals and their Titles/Positions that are members of the CAG Sub-Committee:

- Al Larson, Interim Director, Central Arizona Government (CAG)
- [Micah Miranda](#), Economic Development Director – City of Maricopa
- Belinda Akes, Economic Development, Eloy, Arizona
- Jim Rhodes, Director Small Business Development Center (SBDC), Central Arizona College
- Tim Kanavel, Economic Development Director for Pinal County
- Sam Hosler, Mayor of Kearny, Arizona

Administrative participants:

- Al Larson - CAG Program Director
- Bill Bolin - Vice President of Operations, STS – Digital Broadband Community Planning Consultant

Appendix I

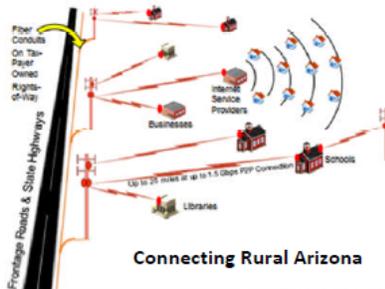
Broadband focused Web pages

CAG and several of its communities provided links to the below page:

Digital Arizona Program

DIGITAL ARIZONA TACTICAL MODEL

With the passing of SB1402 in 2012 the Arizona Department of Transportation can allow for conduit trenching along state highways/roads. The private service providers will lay the conduit and pull the fiber.



Fiber along state highways/roads will demark at key locations where it is most economical to utilize existing micro-wave and/or other communications infrastructure to supply additional broadband capability to businesses, homes, governments, libraries, public safety, schools and health facilities.



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.

CENTRAL ARIZONA GOVERNMENTS

RURAL BROADBAND UPDATE

The Digital Arizona Program (DAP) is funded by the National Telecommunications and Information Administration (NTIA) State Broadband Development Initiative (SBDI), a federal grant to the State of Arizona. DAP is managed by Arizona Strategic Enterprise Technology (ASET) and its planning partner, the Arizona Telecommunications and Information Institute (ATI Institute).

CAG's broadband focused on two counties:

Pinal County and Gila County

Community Data Sets were created from November 2012 to January 2013, to show the assets including socio-eco data, broadband providers, utilities, school districts health-care facilities, State Highways, Rail Roads, employers and major occupations within each county. This data was integrated with the Arizona Broadband Community Planning Map, located at: <http://broadbandmap.az.gov/CommunityPlanningMap/>.

CAG's Economic Development Council created a Broadband Sub-Committee.

Broadband Sub-Committee members are from the local communities within CAG's two county region. The members have ranked the importance of applications to enhance the quality of life in rural Arizona. The applications ranking includes: 1) Economic Development- Jobs, 2) Education, 3) Tele-Health and 4) Public Safety.



Community Commitment:

Members of the Broadband Sub-Committee are currently obtaining data speeds from providers that service the anchor institutes that host the applications. You are invited to conduct your own speed test from your home and/or work. The Arizona Broadband Speed Test site is:

<http://digitalarizona.gov/Survey/inArizonaQuestion.html>.

DOWNLOAD SPEED UPLOAD SPEED

CAG is concluding the Community Planning Project and moving towards Technical Assistance, where service providers, communities and businesses will work together to formulate plans to increase broadband capacity in CAG's counties. The Arizona digital broadband website is: <http://digitalarizona.gov> for additional information!

Appendix

<http://www.cagaz.org/>

CAG Home Page

The screenshot shows the CAG Home Page with a navigation menu on the left containing icons and labels for CEDS, MAPS, MOD, REPORTS, and TIP. The main content area is titled "Central Arizona Governments" and "INFORMATION & UPDATES". It features a "CALENDAR" widget showing the month of March. The primary text section is titled "Employment Opportunity - Community Development Coordinator" and describes a search for a coordinator. Below this, there are sections for "CAG Rural Broadband" and "Broadband Sub-Committee". The "Broadband Sub-Committee" section lists four ranked priorities: Economic Development- Jobs, Education, Tele-Health and, and Public Safety.

Central Arizona Governments **INFORMATION & UPDATES** **CALENDAR** View All

Employment Opportunity - Community Development Coordinator

The Central Arizona Governments (CAG) is seeking a Community Development Coordinator for its Planning Department. CAG serves a growing region and encompasses 17 communities, 3 Native American tribes, 2 counties and a total population of 430,000 residents. Community Development programs serve an important role for the region and programs over 1.2 million dollars in Community Development funds annually.

Read More ...

CAG Rural Broadband

Community Data Sets have been created for Pinal and Gila County for the time period of November 2012 to January 2013. These data sets show the assets including socio-economic data, broadband providers, utilities, school districts, health-care facilities, State Highways, Rail Roads, employers and major occupations within each county. This data was integrated with the Arizona Broadband Community Planning Map, located at: [Community Planning Map](#)

CAG is now concluding its Community Planning Project and moving towards Technical Assistance, where service providers, communities and businesses will work together to formulate plans to increase broadband capacity in CAG's counties. For additional information visit the Arizona digital broadband website: digitalarizona.gov

Broadband Sub-Committee

CAG created a Broadband Sub-Committee through its Economic Development Council. Members of the Broadband Sub-Committee were chosen from local communities throughout CAG's two county region.

Committee members have ranked the importance of applications to enhance the quality of life in rural Arizona. The applications ranking include:

1. Economic Development- Jobs,
2. Education,
3. Tele-Health and
4. Public Safety.

CAG is concluding the Community Planning Project and moving towards Technical Assistance, where service providers, communities and businesses will work together to formulate plans to increase digital broadband capacity in CAG's regions. The Arizona digital broadband website is: <http://digitalarizona.gov> for additional information!

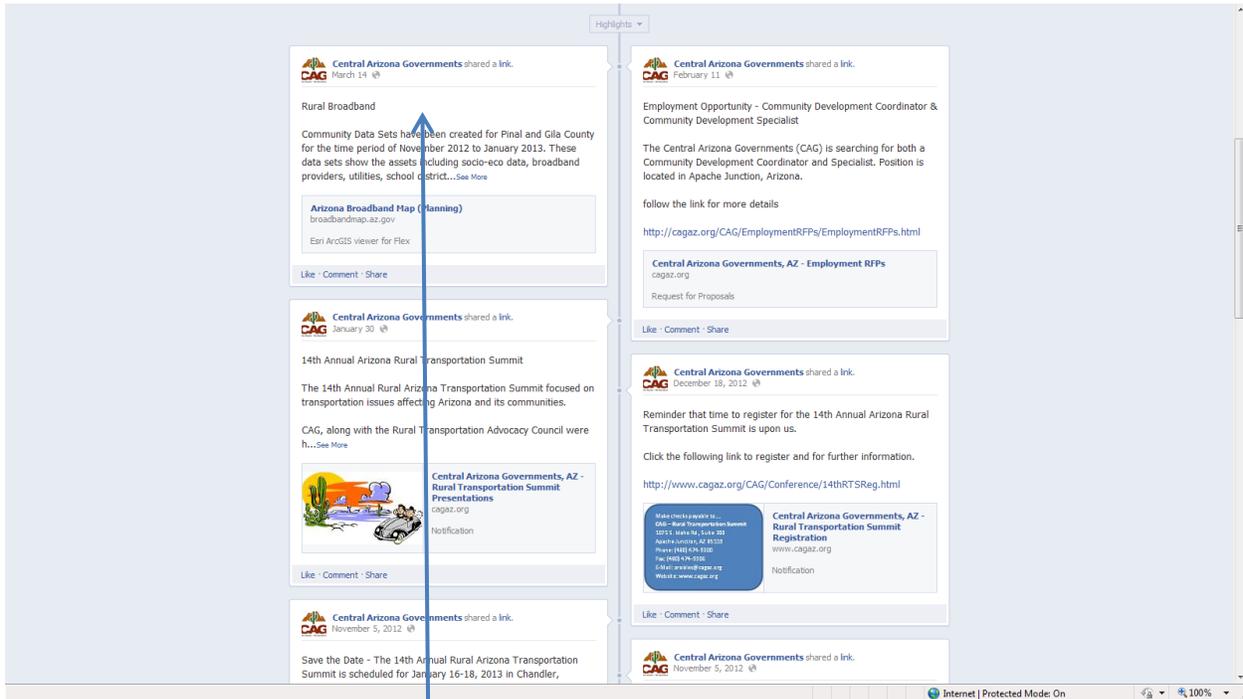
CAG links to Digital Arizona Program webpage update:

CENTRAL ARIZONA GOVERNMENTS RURAL DIGITAL BROADBAND UPDATE

The Digital Arizona Program (DAP) is funded by the National Telecommunications and Information Administration (NTIA) State Digital broadband Development Initiative (SBDI), a federal grant to the State of Arizona. DAP is managed by Arizona Strategic Enterprise Technology (ASET) and its planning partner, the Arizona Telecommunications and Information Institute (ATI Institute).



CAG has put Broadband on Facebook.



CAG includes Arizona's Rural Broadband is on Facebook

Appendix J



State of Arizona
Department of Education
Office of John Huppenthal
Superintendent of Public Instruction

March 7, 2012

Dear Legislator:

I would like to call your attention to two bills now working their way through the legislature, SB 1402: broadband conduit installation; right of way; ADOT and SB1403: digital Arizona infrastructure office. These bills are critically important to our mission in providing access to education technology throughout the state. SB1402 and SB1403 provide a cost effective way of providing this access by allowing Arizona's Department of Transportation to lay the fiber conduit for digital access either concurrently or independently of highway construction projects, thereby saving the state and our rural schools and communities significant funds.

SB1402 and SB1403 will help the Department of Education address two very significant problems. Our rural education communities across the state do not have adequate access to technology infrastructure that will enable quality digital learning. It is particularly critical these communities have this infrastructure because many of these communities have significant challenges in attracting and retaining highly effective teachers. This infrastructure will allow their students to access quality instruction online that would not otherwise be available to them.

As a second benefit, communication throughout the education community is critical as we attempt to cut travel costs associated with professional development and the roll out of programs that will move education forward. As we continue to expand the power of digital learning, without SB1402 and SB1403 many education communities throughout the state will be left behind and be tied to an archaic and ineffective education model that has thwarted the advancement of student achievement. The minimum speed that is educationally sufficient to support ADE's transformational plans is 6 Megabits per second (up and down) per student. This speed enables uninterrupted video streaming and rapid downloads of education content whether a student is at home or at school.

We view SB1402 and SB1403 as critical to our ability to transform education in Arizona. We hope you agree and will support these significant bills.

A handwritten signature in black ink that reads "John Huppenthal".

John Huppenthal
Superintendent of Public Instruction



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