

8. Broadband Community Profiles

Yolo County

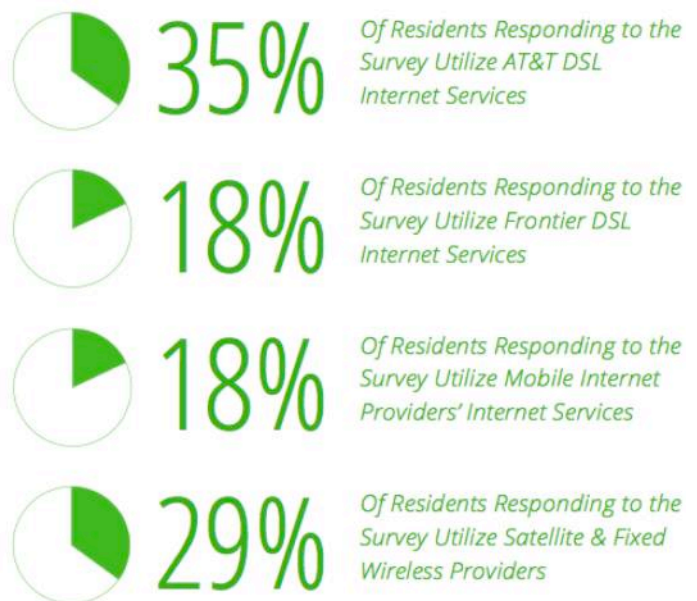


A. Residential

The residential broadband market in unincorporated Yolo is served by multiple wireline providers including AT&T of California, Comcast, Omsoft, Frontier, and Verizon in addition to a few resellers of wireline providers in the area. Fixed wireless providers also have coverage in unincorporated Yolo including AFES, Winters Broadband, and DigitalPath. There is more penetration of satellite and 3G/4G mobile wireless broadband in unincorporated Yolo due to its rural geography and lack of wireline infrastructure.

Within the residential survey, 114 unique responses were received from residents in Yolo, including the communities of Clarksburg, El Macero, Esparto, Knight's Landing, Yolo, Zamora, and the unincorporated County. Fifty-three percent of the respondents utilized either AT&T or Frontier DSL for their broadband services. Forty-seven percent utilized fixed wireless, mobile, and satellite providers. From the research conducted, wireline residential broadband services are provided via copper infrastructure either on cable or DSL systems. Esparto reported that a local cable company served its community that provides local cable and broadband services to residents. Wireless services are provided through terrestrial fixed wireless systems and 3G and 4G mobile wireless carriers¹⁷.

Broadband Internet download and upload speeds reported by the majority of residents surveyed were commensurate with DSL, mobile broadband, and fixed wireless services in the region, however; speeds reported were significantly lower than in any of the cities in Yolo County. Samples were collected from residential broadband subscribers across unincorporated Yolo. Only 5% of respondents



¹⁷ AT&T Mobility, Verizon Wireless, T-Mobile, MetroPCS and Sprint

reported download speeds greater than 10Meg. Some 85% of respondents reported download speeds less than 6Meg. Upload speeds were considerably slower than in any of the cities in Yolo County. Respondents reported dissatisfaction with the speed and reliability of their broadband Internet services, citing many issues with the reliability and consistency of their Internet connections at home. A total of 85% reported their services were unreliable and 79% reported that their services were not fast enough.

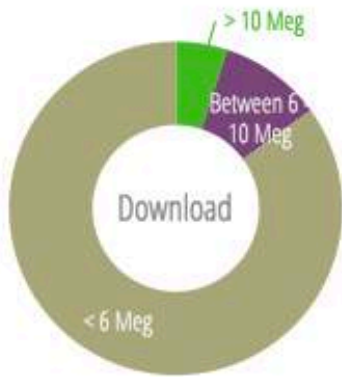
Measuring the pricing for services against the speeds of services that residents received indicated that there was a direct correlation between the price paid for services and the amount of bandwidth ("speed") received by residents. Residents appear to be paying the same prices for their services as in other communities in Yolo County but getting significantly less bandwidth. The chart below illustrates the price of services respondents in unincorporated Yolo County pay and the realized download and upload speeds for these services. It is important to note that the speeds reported are actual recorded speeds that may be different from the speeds residents buy from service providers in the area. In general, DSL, wireless, and cable broadband services are sold with speed increments that define a maximum speed for the service such as "Up to 10 megabits down and up to 1.5 megabits up." Actual speeds vary depending on the physical location of the service and how many subscribers are concurrently on the system. The "maximum advertised speed" should not be construed to mean a sustained maximum but instead the top speed of the service which may be considerably lower over long periods of time.

There are several critically underserved residential communities in unincorporated Yolo County. These communities generally have no broadband services available apart from fixed wireless and 3G/4G. In many cases, these services are intermittent in many of the communities, with significant reliability issues cited by residents responding to the survey.

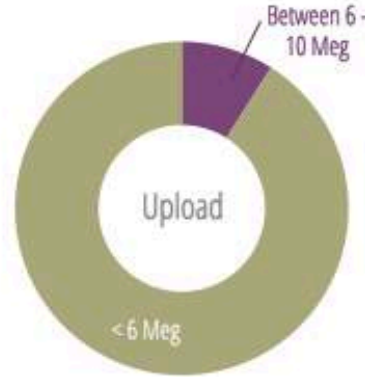
Only a handful of these communities were targeted as "Priority Areas" in the California Advanced Services Fund ("CASF") as strong candidates to receive funding under this State grant program. These Priority Areas were determined on short notice by the CPUC based on data available at the time. The CASF fund would identify improvements to local broadband infrastructure that could enhance these areas with sufficient wireline and wireless broadband infrastructure. LAFCo, in conjunction with Valley Vision submitted these Priority Areas to the California Public Utilities Commission ("CPUC") to bring visibility to the most needy communities in Yolo County. A summary of these areas is provided on the following pages. In addition, Yolo's other rural and unincorporated communities are included in this Plan to identify other focus areas for future broadband development.

Residential Broadband Services - Yolo County Survey Data

Residential Broadband Download Speed Test Results



Residential Broadband Upload Speed Test Results



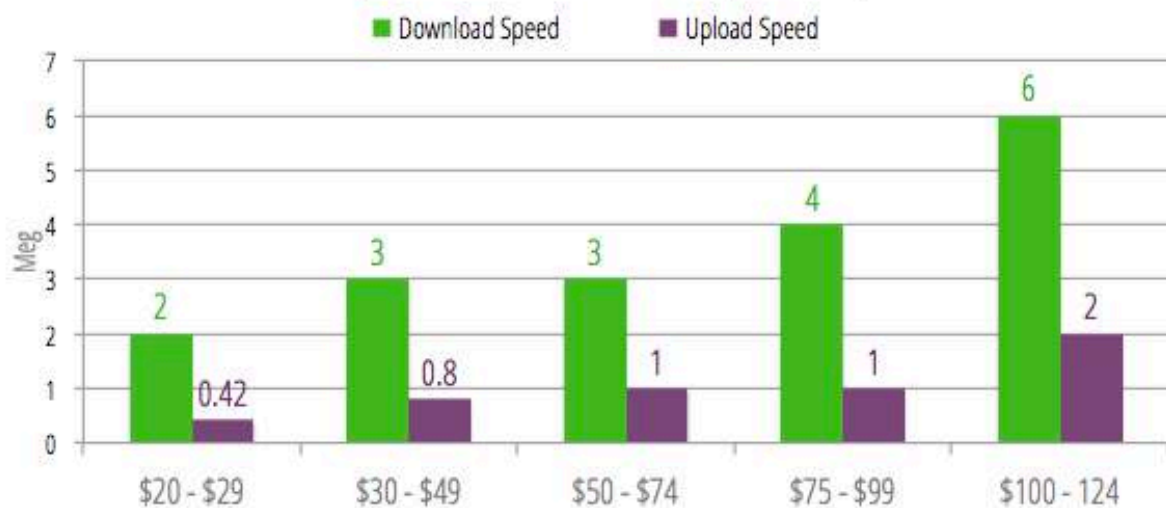
Reliability of Current Broadband Services



Speed of Current Broadband Services



Monthly Internet Costs Versus Speeds Reported



The charts below identify communities in unincorporated Yolo County that are underserved, unserved or rural. These communities are sorted by unserved first (in red), followed by underserved (in yellow), followed by served (in green).

Figure 8.1: Critically Unserved Communities in Yolo County

Unincorporated Community	# of House holds	Anchors	CPUC Designation	CPUC Reported Broadband Availability	CPUC Reported Providers	Technology Type	Summary of Speeds Reported
Binning Farms	50	none	Unserved	6-10 down, 6-10 up 6-10 down, 768-1.5 up 6-10 down, 768-1.5 up	DigitalPath, Inc. Winters Broadband AT&T	Fixed Wireless Fixed Wireless DSL	None available
Dunnigan	558	Fire Station Water District	Underserved and unserved	6-10 down, 768 – 1.5 up, inconsistent data in CPUC maps	Succeed.net AT&T (Limited)	Fixed Wireless DSL (limited)	Maximum speed 5 meg down, 1 meg up
Knights Landing	343	Library Fire Station Sci-Tech Academy (K-6 charter) Community Services District	Unserved	6-10 down, 768-1.5 up 6-10 down, 6-10 up inconsistent data in CPUC maps	DigitalPath, Inc AFES	Fixed Wireless DSL (limited)	Maximum speed 3.6 meg down, .5 meg up
North Davis Meadows	95	none	Underserved	6-10 down, 768-1.5 up 6-10 down, 768-1.5 up	DigitalPath, Inc Winters Broadband AT&T	Fixed Wireless Fixed Wireless DSL (limited)	None available
Zamora	14	Fire Station	Unserved	6-10down, 768-1.5 up	DigitalPath	Fixed wireless	None available
Yolo	165	Library Fire Station Cache Creek HS (continuation) Community Services District	Unserved and Underserved	6-10 down, 768-1.5 up 768-1.5 down, 200-768 up	DigitalPath, Inc AT&T (Limited)	Fixed Wireless DSL (limited area)	Maximum speed 4.5 meg down, 1.2 meg up

Figure 8.2: Critically Underserved Communities in Yolo County

Unincorporated Community	# of House holds	Anchors	CPUC Designation	CPUC Reported Broadband Availability	CPUC Reported Providers	Technology Type	Summary of Speeds Reported
Clarksburg	182	Fire Station Library Delta K-6 School (Charter) Clarksburg Middle School Delta High School	Served, small segment of unserved	6-10 down, 768-1.5 up	Frontier	DSL	Maximum speed 3.15 meg down, .6 meg up
El Macero	351	none	Served and unserved	10-25 down, 10-25 up	Succeed,net AT&T DigitalPath	DSL Fixed Wireless Fixed Wireless	Maximum speed 6 meg down, .9 meg up
Esparto	905	Community Services District Fire Station Library Esparto K-8 school Esparto High School	Underserved, small segment of Unserved	10-25 down, 10-25 up	AT&T	Fixed Wireless DSL Fixed wireless	Maximum speed 11.26 meg down, 1.7 meg up
Monument Hills	150	none	underserved	6-10 down, 768-1.5 up	AT&T DigitalPath ,Inc	DSL Fixed Wireless	None available
Patwin Road (outside Davis)	32	none	Unserved and Underserved	6-10 down, 768-1.5 up 768-1.5 down, 200-768 up	DigitalPath Winters BB AT&T	Fixed Wireless Fixed Wireless DSL	None available
Royal Oak	120	None (Mobile home park)	underserved	10-25 down, 768-1.5up	AT&T	DSL	Maximum 3.32 meg down, .5 meg up
West Plainfield/Airport	50	Fire Station Plainfield Elementary School Yolo County Airport	Unserved and Underserved	6-10 down, 768-1.5 up 3-6 down, 768-1.5 up 3-6 down, 200-768 up	DigitalPath Winters BB AT&T	Fixed Wireless DSL	None available
Willow Oak (outside Woodland)	40	Elementary School Fire Station	Underserved	6-10 down,768-1.5 up 1.5-3 down, 200-768 up	Digital Path AT&T	Fixed wireless DSL	None available

Figure 8.3: Other Rural Communities in Yolo County

Unincorporated Community	# of House holds	Anchors	CPUC Designation	CPUC Reported Broadband Availability	CPUC Reported Providers	Technology Type	Summary of Speeds Reported
Guinda	40	Fire Station	Served	10-25 down, 1.5-3 up	Frontier	DSL	None available
Capay	25	none	Served	10-25 down, 1.5-3 up	Frontier AT&T Various fixed wireless	DSL DSL Fixed Wireless	None available
Rumsey	15	None	Served and unserved	10-25 down, 1.5-3 up	Frontier	DSL	Maximum 26 Meg down, 1 meg up
West Kentucky	22	none	Served	10-25 down, 3-6 up	AT&T	DSL	None available
Madison	137	High School (Continuation) Fire Station Post Office Community Services District	Served and unserved	25-50 down, 6-10 up	AT&T	DSL	Maximum 5.01 meg down, .5 meg up
El Rio Villa	40	Owned by Housing Authority (falls under SB 1299)					None reported

B. Business & Agriculture

A few businesses reported on their broadband services in unincorporated Yolo County. These businesses were generally from the agricultural and farming community. Due to a lack of formal reporting, it was necessary to utilize anecdotal information when trying to understand the state of broadband for these rural organizations. The reports received detailed significant wireline connectivity issues in the small towns across the County, particularly in Knight's Landing, Esparto, and Clarksburg. They cited the lack of any wireline options that provided an adequate service for them and had adopted 3G/4G wireless as their only alternative that was fast enough for their needs.

Agricultural businesses in particular cited the use of wireless technologies as the only options for their connectivity needs. In these cases, they too utilized 3G/4G wireless options as well as fixed wireless solutions from providers such as AFES, DigitalPath, and Winters Broadband. Several agricultural businesses cited the growing need for broadband services as critical to managing their businesses. The need for broadband extends to agricultural areas to support traditional and organic farms to monitor crop rotation within fields, saturation of fertilizer content, and distribution of water across farms. The concept of the "Smart Farm" enables farms to monitor and manage resources electronically to improve overall productivity and yield. A network of sensors connected within the fields allows them to collect key data but, these organizations need next-generation broadband to upload that data to the Internet and connect with suppliers, researchers, and fellow farmers. As an important agricultural and seed tech center, Yolo County must find ways to enable next-generation broadband in some of the most rural areas of the community. Doing so will require unique approaches to making broadband infrastructure available in places where it is generally most difficult to achieve.

Comments from Businesses in Yolo County:

Guinda Farm – "We have a warehouse and multiple work from home locations so it is critical for our workflow"

Guinda Local Business – "Frustrated by the lack of reliability and speed in our local services"

Capay Farm – "Mobile connectivity is the only option in our location; we have to use two to get the reliability we need"

Yolo County has also been planning the development of the designated commercial areas around the Yolo County Airport to expand local economic development opportunities. The Airport is located in an area northeast of Davis that is not well served by commercial broadband services and this may become an obstacle to businesses looking to locate at or near the Airport.

C. Community Anchors

Education

Educational organizations across unincorporated Yolo County report varying degrees of need for broadband services. Many schools are located in unincorporated communities such as Brooks, Clarksburg, Esparto, Knights Landing, Monument Hills, Plainfield, Willow Oak and Yolo. Some communities are better connected than others. For example, some schools in Esparto are connected to fiber provided by a local provider and maintain high-speed connections back to the Board of Education where they receive centralized services. Others utilize T1 and DSL services because fiber options are not available or affordable to them. As online education grows for school districts, the importance of their broadband services becomes even more important to deliver a blended curriculum to their students. As new testing requirements from California's Common Core State Standards take effect this year, districts will rely on their broadband connectivity for more advanced online testing programs; therefore, the long-term broadband needs of Yolo County's schools should be considered a critical component of local broadband development. Rural schools with basic broadband infrastructure should plan for upgrades in their broadband services to ensure they have the capabilities to meet state standards. In some of Yolo's rural communities, it is questionable whether these services are even available in the local community.

A second broadband challenge that faces education and the general community is the discrepancy that exists between students' access to broadband services at school versus at home. In many cases, schools are equipped with the necessary broadband to allow students to take advantage of all online opportunities. One of the primary issues is however, when these students go home, many residents in these communities do not have sufficient broadband access or cannot afford it. The result is that students have different educational experiences depending on where they live. Students in rural communities may have high-speed access at school but have only dial-up or satellite Internet at home whereas in urban communities residents have faster Internet at more affordable rates. This creates an equality issue that impairs students that live in rural communities.

Teen in Yolo using the Library's WiFi afterhours to get online



Healthcare

Healthcare organizations in unincorporated Yolo County have a mix of broadband services that use DSL, cable, or T1 connectivity. Several healthcare providers interconnect with the California Telehealth Network ("CTN") for telehealth and other electronic health services. These organizations are currently using T1 connectivity that is marginally sufficient for their needs. The Knight's Landing Health Clinic reported basic using basic DSL services that were constantly down, resulting in their inability to access

online health applications that supported patient care. As telehealth applications grow, these organizations will require upgrades to higher speeds to take advantage of many new offerings provided by CTN. Healthcare providers also need access to next-generation broadband to ensure they are equipped for electronic medical records, distance viewing, and virtual physician visits.

Local Government

A key issue facing Yolo County government is its reliance on the Comcast I-Net fiber that is part of the Franchise Agreement between Comcast and the City of Davis. The County maintains 2 sites that are connected to the I-Net fiber and an interconnection to UC Davis that also utilizes I-Net fiber (3 connections total). If the City of Davis is unsuccessful in renewing the free use of the I-Net fiber, it will force the County to either begin paying for this connectivity or procure new connectivity from another provider in the area. The potential cost to the County could be significant and ongoing, for which the County would need to allocate a budget.

Yolo County maintains an existing fiber and conduit network that interconnects its offices through West Sacramento, Woodland, and Davis. The network provides connectivity for Yolo County and related offices. The network is currently linear but has the potential to interconnect West Sacramento to Davis directly that would “close the ring” and provide a fully redundant fiber network between the three cities. The network currently provides 1Gbps between County sites, which will be upgraded in the future to 10Gbps. The network has varied fiber counts of 12, 24, 36, and 48-count cable across different segments. The County has expressed desire in expanding the network to provide additional connectivity to new facilities. Cities have also expressed interest in using County network resources for their own applications. Local broadband providers have even approached the County to discuss utilizing the network.

Expansion of this network through collaboration with other stakeholders could become an important strategy to expand the availability of broadband infrastructure in Yolo County. The network could be utilized to provide valuable interconnection between cities in Yolo County to support municipal functions such as emergency operations, data sharing, and collaboration. It may also provide an opportunity to aggregate local government demand for Internet, voice, and other technology services that would allow these organizations to procure greater volumes of services to reduce overall costs for all Yolo government organizations. This could include connecting the school districts, healthcare providers, municipal organizations, and public safety agencies to a common network. In many cases, these networks have been found to save millions annual in taxpayer dollars. In addition, Yolo County Housing has expressed desire to expand the wireless services available at its facilities, equipping public housing with WiFi to expand residents’ access to online resources. Yolo Housing Authority has also expressed interest in applying for grant funding to outfit its facilities with these wireless capabilities.

This network could also become a platform to expand broadband availability to cities, rural communities, and agricultural areas in parts of Yolo County. The network is in close proximity to many commercial districts in Woodland, West Sacramento, and Davis. It also passes areas outside of each city boundary that are not well served by existing broadband providers. In these cases, it could be

utilized as a backbone for new deployments of fiber within each city and a backhaul network to connect the three cities to one another. Furthermore, it passes rural areas that may present opportunities to interconnect with farms and agricultural businesses, which today have no other options beyond satellite and 3G wireless connections in most cases.

Evaluation of the network's capabilities will be required to better understand the feasibility of utilizing such an asset for these purposes. The network does not have a surplus of capacity and the County will need to analyze how much available capacity could be utilized. In addition, some segments of the fiber are direct buried versus placed in conduit. This poses additional challenges in accessing fiber strands within these segments. The recommendations section of this Community Profile lays out the important steps the County should take to determine the feasibility of using this asset.

The Yoche Dehe Wintun Nation

The Yoche Dehe Wintun Nation maintains significant connectivity to its Cache Creek Casino facility to support the data needs of the casino and resort. Tribal members living on the reservation also maintain broadband access to their homes; however, this service is not tied directly to the casino itself. Although high-speed connectivity currently terminates at the Casino, this line may provide a future "jumping off point" to equip other communities surrounding the Casino with upgrades to existing broadband that services residential communities in Esparto, Guinda and agricultural users within the Capay Valley. The Yoche Dehe Wintun Nation and Yolo County should work together to identify where mutual needs exist to support each other's communities with enhanced broadband services, to support public safety, emergency management and fire department coordination between the organizations.

D. Strategies & Action Items

Recommendation 1: The County should continue to develop its broadband infrastructure to reduce internal costs, expand capabilities and protect against future cost increases by:

- a) Developing a GIS-based map that identifies the County locations that should be interconnected including the County's current infrastructure;
- b) Installing conduit with all public projects;
- c) Expanding the County's capability in negotiating agreements for private providers to utilize the County's infrastructure for public benefit; and
- d) Coordinating with other local public agencies (i.e. cities, school districts, UC Davis, YCTD, Yolo County Housing, YCFCWCD, Yolo County Office of Education, etc.) as potential users of the County's infrastructure.

Timing: The County should begin the process of identifying areas for direct and joint investment in broadband infrastructure with other public agencies over the next 12 months.

Recommendation 2: The County needs to develop additional broadband infrastructure in cooperation with cities, other local agencies and local broadband providers by:

- a) Working with each County and other public agencies to build a map of locations where these organizations jointly need broadband connectivity by:
 - i) Developing a GIS-based map illustrating these locations by utilizing the existing Yolo GIS Cooperative;
 - ii) Incorporating County and County CIP projects onto this map to identify the companion projects and joint build opportunities;
 - iii) Sharing maps and data between organizations; and
 - iv) Making sure the maps are updated at least annually.
- b) Coordinating with broadband providers on specific broadband infrastructure projects in communities described in the Critical Unserved and Underserved Communities in Yolo County's Community Profile:
 - i) Identifying infrastructure routes that the County needs;
 - ii) Identifying infrastructure routes that the broadband providers need;
 - iii) Sharing information between organizations for joint build opportunities;
 - iv) Developing a joint build agreement with local broadband providers that allows each organization to install their own broadband infrastructure in these projects; and,

- v) Identifying resources that would be available to fund these projects, including internal County funds and/or available grant or loan programs as described in Recommendation 3.
- c) Coordinating with public agencies and private broadband providers to use broadband infrastructure, towers and other resources to expand wireless coverage into agricultural areas, by
 - i) Working with broadband wireless providers to make access available to County-owned tower infrastructure, ground space at the base of towers and rooftops, ensuring compliance with legislative and security requirements governing access to these resources;
 - ii) Collaborating with other agencies with physical assets in the rural areas such as Yolo County Flood Control and Water Conservation District, Yolo County Transportation District, Yolo County Housing and UC Davis to leverage joint opportunities to expand wireless access in the rural areas of the county;
 - iii) Developing agreements for lease or in-kind exchange of these County-owned assets by broadband wireless providers; and
 - iv) Where feasible, interconnecting County-owned fiber-optic networks with these assets to provide fiber backhaul to broadband wireless providers.
- d) Developing agreements with each County and broadband providers for joint use of broadband infrastructure by:
 - i)
 - ii) Strengthening the current MOU to include joint use agreements that allow sharing of infrastructure between the County and the cities;
 - iii) Actively marketing and identifying opportunities to expand infrastructure with broadband providers.

Timing: The County should accelerate the process of coordinating with other public agencies and broadband providers over the next 12 months and identify opportunities to leverage public broadband infrastructure continuously as a County-level initiative.

Recommendation 3: Target specific State and federal grant and loan programs that will provide funding for Yolo County's unserved and underserved communities by

- a) Through the Tactical Plan, designating a resource at the County that will develop, apply for and manage broadband grants;
- b) Building on the initial grant analysis completed in this Plan for the County to pursue CASF funding (and other programs defined in Appendix D) for these communities;
- c) Developing relationships with broadband providers that define how grant funds will be received and managed and how broadband services will be provided to these communities; and,

- d) Applying for CASF grant funding to expand wireless and broadband services is Yolo County Public Housing facilities;

Timing: The County should immediately identify an internal resource to manage the broadband grant efforts on behalf of the County.

Common Action Items

Recommendation 4: Adopt General Plan policies that incorporate broadband as a public utility and create a policy framework to promote its deployment in public and private projects as appropriate. This includes:

- a) Tailoring the sample policies and standards (included in the appendix) to the County's specific needs and adopt them into the Tactical Plan, local policy, codes and standards (including policies, dig-once, joint trenching, engineering standards, etc.);
- b) Incorporating broadband in the County's Development Impact Fee program and Capital Improvement Plan (CIP) as appropriate and make a commitment to fund broadband infrastructure;
- c) Identifying opportunities to install broadband infrastructure in conjunction with public and private construction projects as appropriate;
- d) Developing a process so that Planning and Public Works coordinate with IT to identify projects that could install this infrastructure at reduced costs;
- e) As the County builds out its network, maintaining broadband infrastructure in the County's GIS system, requiring GIS-based as-builts and implement any other means for accurate documentation;
- f) Evaluating ways to streamline the broadband permitting processes within public rights of way to ensure broadband providers do not face unnecessary obstacles to building infrastructure; and
- g) Evaluating fees levied to broadband providers for constructing broadband infrastructure to ensure they do not discourage broadband investment.

Timing: The County should adopt General Plan policies and implementing codes and standards over the next 12 months. Implementation should be ongoing.

Recommendation 5: Coordinate with other agencies with facilities in the County (i.e. cities, school districts, UC Davis, YCTD, Yolo County Housing, YCFWCD, Yolo County Office of Education, etc.) on a regular basis to leverage opportunities to reduce broadband construction costs by:

- a) Reviving the regular Utility Coordination Meeting attended by the cities/County (and potentially add the public agencies listed above) to facilitate the long-term planning of broadband infrastructure; and
- b) Coordinating on a regular basis to identify opportunities for joint construction, use and broadband infrastructure sharing between local agencies to lower costs and maximize public benefit.

Timing: The County should develop these collaborative programs with other public agencies over the next 3 months.