

**The Colorado Department of Local Affairs**

**DoLA EIAF Contract #6832**

## **Southwest Colorado Access Network**

### **Final Report**

**The Southwest Colorado Council of Governments**

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## EXECUTIVE SUMMARY

Broadband is virtually a utility for businesses and home-based employment now, no different than water, sewer, telephone service, electricity, and roads. Without widespread broadband access and adoption, Colorado economies and education will not achieve their full potential. Areas without adequate internet access, rural or urban, have fewer opportunities for businesses to start and grow, and are less desirable places to live for employees and families. The expansion of broadband access is crucial for furthering Colorado's economic and educational growth, according to a [report](#)<sup>1</sup> prepared by the Southwest Colorado Council of Governments (SWCCOG).

This observation was recognized early on in the remote, rural areas of Southwest Colorado. Advancing the telecommunications infrastructure throughout the region has been a documented priority for well over a decade. With the decline of energy revenues and employment, diversifying the economy is especially critical in the coming years. The ability of regional businesses and residents to access new technologies and telecommunications services is key to fostering economic growth. Adequate telecommunications coverage requires substantial investments from both the private and public sectors to bring services to areas where private companies cannot (or will not).

In 2010, the SWCCOG was awarded a \$3 million grant to implement a high capacity network for the regional governments. This network, known as the Southwest Colorado Access Network (SCAN), was the SWCCOGs first large scale endeavor. The total project, including local matching funds, was over \$4 million. The grant was the result of [Senate Bill 09-232](#)<sup>2</sup>, and was awarded by the Colorado Department of Local Affairs (DoLA). In 2011, Dr. Rick Smith was selected as the Project Manager, and spent the following years guiding the project through its various stages.

The vision - SCAN will build a state of the art private telecommunications network to provide secure connections between governmental offices, educational institutions, law enforcement, libraries, fire departments and medical facilities. The SCAN will offer high speed transmission, greater bandwidth, voice over internet protocol (VOIP), telephony internet services in an efficient and cost-effective manner.

Many communities have already seen increased bandwidth and lower costs as a result of the SCAN funds. As an example, in Dove Creek the bandwidth at the county courthouse went from 8 Megabits (Mb) to 20 Mb, while the schools went from 10 Mb to 30 Mb. Overall, the SCAN has brought the potential bandwidth up to 100 Mb in the town.

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<sup>1</sup> Broadband White Paper – Use, Impact and Implications. Report by the SWCCOG, in cooperation with Roger Zalneraitis, Executive Director, La Plata County Economic Development Alliance.

<sup>2</sup> S.B. 09-232 Mineral Impact Revenue To Local Governments.

Another example is the Bayfield School District. Their bandwidth has increased from 6 Mb to 100 Mb while decreasing costs by approximately \$400 per month. Bayfield School District's new capacity has allowed them to improve access across the entire district.

In Durango, four internet service providers (ISPs) are utilizing dark fiber leases totaling about 4.5 miles of fiber. The ISP's have been able to increase bandwidth speeds to many businesses and residences by utilizing municipal fiber. In Ignacio, broadband speeds at the library increased from 10 Mb to 50 Mb, with no additional costs.

In Cortez, the SCAN project has aggregated services at a price point equal or better than DSL pricing from the incumbent provider. The internet connections went from 45 Mb for \$3,000 per month to 250 Mb for about the same price. Bandwidth increased five and a half times for the same cost. An example in Cortez is the Unlimited Learning Center, which went from using four T1 lines bundled together for 6 Mb at well over \$1,000 a month to using 50 Mb for about \$600 per month. They use this new high speed connection to provide distance learning locally, and to communities in Alaska and Utah.

The project was also successful in fostering a spirit of cooperation between local governments and local ISPs. There is now awareness on both sides of the potential for private sector business opportunities using the open access model. FastTrack, for example, has come from the point of not considering any open access network connections to doing a partnership with the Town of Bayfield and sharing fiber builds on an open access network basis. The Towns of Dolores and Mancos also partnered with FastTrack to share fiber so as to avoid over building and cut costs. USA Communications has entered into a partnership with Pagosa Springs and Archuleta County to share network expansion costs.

However, due to some very specific Colorado State laws the SWCCOG and the participating local governments are limited in how much impact the SCAN can and will actually have within the region. Currently, [Senate Bill 05-152](#)<sup>3</sup> places limits on local governments to partner with private companies to fully develop and serve the community as a whole. Due to this, only the local government buildings, schools, libraries, fire departments, police departments, and other governmental entities can benefit from the state's major investment at this time. Colorado should seek to make common sense updates to its regulatory and statutory environment guided by the following principles: provide regulatory certainty, ensure public safety, and support broadband deployment in underserved areas.

Overall, this highly technical and complicated venture has been a great accomplishment for the communities of the SWCCOG. By constructing this publicly owned open access network the region has created an asset for business growth and job development opportunities. Now, the

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<sup>3</sup> S.B. 05-152 A Bill For An Act Concerning Local Government Competition In The Provision Of Specified Communications Services.

goal is to build on and sustain the network in ways that will facilitate communication between governments and constituents, and increase economic competitiveness.

In closing, the SWCCOG is very proud of what the SCAN project has achieved - namely increased broadband capacity at lower costs, and facilitated cooperation with service providers who also have much to gain from an open access network. The region looks forward to more success stories as governments, businesses and private citizens are able to take advantage of the network.

## INTRODUCTION

In 2010 the Southwest Colorado Council of Governments (SWCCOG) was awarded a \$3 million grant to implement a high capacity network for the regional governments. This network, known as the Southwest Colorado Access Network (SCAN), was the SWCCOG's first large scale endeavor. The SWCCOG area encompasses Archuleta, Dolores, La Plata, Montezuma, and San Juan Counties, which includes the municipalities of Bayfield, Cortez, Dolores, Dove Creek, Durango, Ignacio, Mancos, Pagosa Springs, Rico, and Silverton. The primary driver for this initiative was the lack of affordable broadband options, and in some cases complete absence of broadband capabilities in the region.

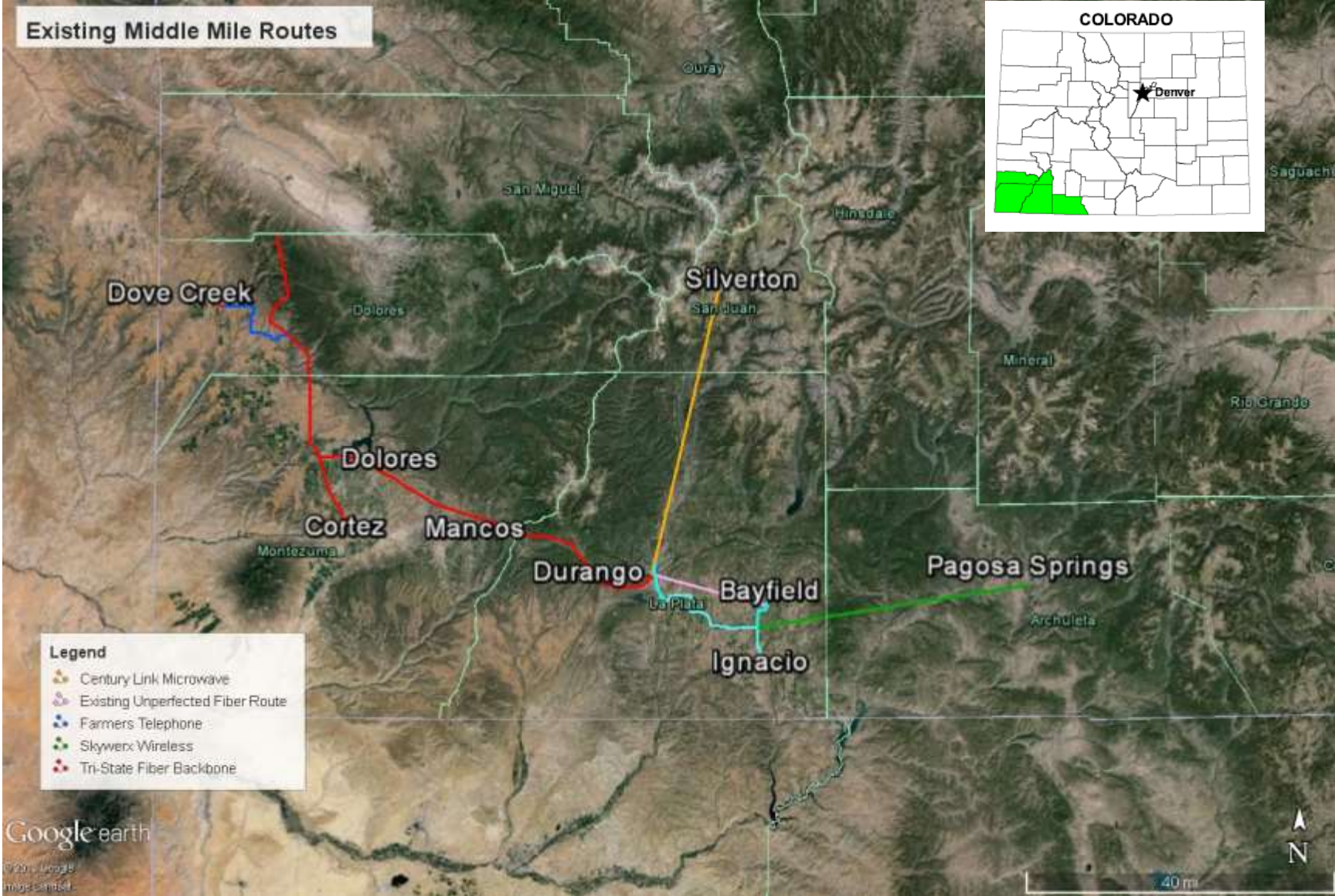
The total project, including local matching funds, was over \$4 million. The grant was the result of [Senate Bill 09-232](#) and was awarded by the Colorado Department of Local Affairs (DoLA). SB 09-232 distributed money to communities impacted by the production of energy resources on federal mineral lands. The SCAN project, enabled by the DoLA grant funds, called for the completion of "last-mile" fiber and wireless infrastructure used to connect community anchor institutions (CAIs) such as local governments, public safety, schools, hospitals, and libraries to a community aggregation point. A short (three minute) video with [Ed Morlan](#), the Executive Director of the Region 9 Economic Development District provides background for the project.

The project, managed by Dr. Rick Smith, has been about a three year undertaking, and as of March 31<sup>st</sup>, 2014 the building of infrastructure and the DoLA grant was officially completed. Through the process of collaboration with community anchor institutions, and by working together with existing private internet service providers (ISPs), the participating communities and counties have created a groundbreaking network in Southwest Colorado.

Overall, this highly technical and complicated venture has been a great accomplishment for the region. The establishment of policies, procedures, and a business plan helped to guide the planning and construction phases.

By constructing this publicly owned open access network the Region has created an asset for future business growth, economic development and educational opportunities. Now, the goal is to build on and sustain the network in ways that will facilitate communication between governments and constituents, and increase economic competitiveness.

The funds were insufficient to connect the communities in to a larger regional network. Therefore the SWCCOG has partnered with telecommunication vendors and with federally funded projects such as EAGLE-Net to construct the inter-community networks. These “middle-mile” networks connect the communities to a regional backbone, as shown on the following page.



## PROJECT OBJECTIVES

*Vision: SCAN will build a state of the art private telecommunications network to provide secure connections between governmental offices, educational institutions, law enforcement, libraries, fire departments and medical facilities. The SCAN will offer high speed transmission, greater bandwidth, voice over internet protocol (VOIP), telephony internet services in an efficient and cost-effective manner.*

The objectives for the SCAN project were outlined in the DoLA Energy Impact Grant Application. Many of these objectives have already been met while others will require more time to evaluate and/or realize.

### **1. Local governments will operate more efficiently as communication between agencies and constituents improve.**

High speed communications is a prerequisite for effective government. While each of the local projects had different program aspects, benefits now (or will) include: redundant off-site backup of critical data; failover of public safety and homeland security dispatch services between the counties; direct link between hospitals and health providers; and sharing of services and resources such as applications and IT staff.

Prior to the SCAN project, data communication services to the La Plata County Bayfield Road & Bridge Shop and the County Clerk office in Bayfield was handled with 1.5 Mb T1 circuits. Today, the County is providing 100 Mb access to those same facilities at a fraction of the cost. Along with the faster service is improved services such as extending the VoIP system and providing a law enforcement records management system to the Bayfield Marshall's office are now a reality.

Many applications were already shared, such as police records. However, the SCAN project also enabled the sharing of the *Spillman* system. It offers an integrated suite of comprehensive software solutions for public safety agencies, including police departments, sheriff's offices, communication centers, fire departments, and correctional facilities. The software can provide CAD, RMS, JMS, Fire, Mobile Data, Data Sharing, Field Reporting, Mapping & GIS, Crime Analysis & CompStat, and Personnel & Resources modules utilizing separate and single point database services. In addition to these services, Spillman also has mobile app architecture for iPads for mobile deployment. This system is now used by the La Plata County Sheriff's office, the Durango Fire and Rescue, Durango Police Department, and the Bayfield Marshal's office to varying degrees.

Some examples of the other ways in which the inter-connected government network could be used include: coordinating the purchase of major systems, sharing of other software systems, such as asset management systems, and providing emergency backup services both in terms of hardware and software and personnel.



The following three objectives of universal access, geographic equality and a level playing field were actually beyond the scope of the SCAN since funds were not available for middle-mile infrastructure. However, these objectives remain as future goals to be realized in communities of the SWCCOG.

- 2. Universal Access: Every business and home should have the same level and quality of service.**
- 3. Geographic Equality: Every area of the region should have the same level and quality of service.**
- 4. Level Playing Field: Every service provider should be able to play by the same rules. True competition = better service and lower the cost of services for all.**

These objectives probably will not be met until the state regulatory and statutory environments change. A recent report notes that

“Colorado’s regulatory and statutory environment sets the playing field for how our telecommunications system operates. The past decade has seen a rapid transformation of telecommunications from a voice-based system to the world of broadband. In order for the State of Colorado to adapt to this rapidly changing environment, it is imperative that the state modernize its statutory and regulatory environment to encourage private sector investment and public-private partnerships to meet the challenges in providing broadband to the entire state. At the same time, continuing to ensure the protection of consumer interests and public safety is critical. Colorado should seek to make common sense updates to its regulatory and statutory environment guided by the following principles: provide regulatory certainty, ensure public safety, and supporting broadband deployment in underserved areas.” [Bridging the Digital Divide – Expanding Broadband Infrastructure Throughout Colorado](#)

In any event, the SW Region will continue to facilitate solutions that will make the entire region a premier technological community.

- 5. Public/Private Partnerships: The network should create private sector business opportunities and foster economic development.**

This objective was paramount in the open access model, and there have been many success stories. However, due to some very specific Colorado State laws the SWCCOG and the participating local governments are limited in how much impact the SCAN can and will actually have within the region. Currently, [Senate Bill 05-152](#) places limits on local governments to partner with private companies to fully develop and serve the community as a whole. Due to this, only the local government buildings, schools, libraries, fire departments, police departments, and other governmental entities can benefit from the state’s major investment at this time.

If the SWCCOG and partnering local governments were allowed to lease more than a small percentage of publicly owned fiber or infrastructure, the citizens of the region could very well see lower prices and more competition for broadband connectivity. This would lead to much needed economic development in areas that are sorely lacking. The region stands to benefit greatly from such a strong and robust network, but with S.B. 05-152 access and benefits to the network for residents and businesses is very limited. For further discussion of this topic and how it has affected the municipalities in the region go to a short (seven minute) video of [Eric Pierson](#) – Information Systems Manager for the City of Durango.

The project was successful in fostering a spirit of cooperation between local governments and ISPs. There is now awareness on both sides of the potential for the open access model. The project has also created private sector business opportunities. FastTrack, for example, has come from the point of not considering any open access network connections to doing a partnership with the Town of Bayfield sharing fiber builds on an open access network basis. USA Communications has entered into a partnership with Pagosa Springs and Archuleta County to share network expansion costs. For a discussion on these cooperative efforts see a short (eight minutes) video interview with several of the [key players](#) in the public and private sectors.

**6. Community Control: Open Access lowers cost for private sector service providers and creates new opportunities for companies that cannot build fiber networks in rural areas.**

This objective has seen its best results in the City of Cortez, which has not been constrained by the limitations imposed by S.B. 05-152 as their network was already in place and they were “grandfathered” out. The open access network in Cortez has seven private service providers utilizing the network to bring services to the CAIs and businesses and citizens. The telecommunications infrastructure can, and should be, seen as a digital road on which many service providers can ride rather than each provider having to build a separate road to deliver services. A short (three minute) video discussion of the digital road analogy is presented by [Rick Smith](#), the Director of General Services in Cortez.

**7. Multi-Service Networks: Open networks create true competition and lower prices. Multiple service providers offering different service packages and bundles at a variety of price points will enhance the local economic climate by attracting new businesses.**

While there is clearly demand for higher and higher broadband speeds, supply is challenged by the economics of investment. Broadband investment is most likely to yield profits where the highest density of customers exists. This allows firms to spread the investment cost across a large number of users and generate a return more quickly. In places with fewer potential customers, a positive return on investment is much more difficult to achieve. In the SW Region

the mountainous terrain also imposes challenges to developing infrastructure. These limitations may be partially resolved by the legislation proposed in [Senate Bill 12-157](#)<sup>4</sup>.

**8. High Capacity Bandwidth: Limits on bandwidth chokes off economic development, entrepreneurial activities, and work from home opportunities.**

As Roger Zalneraitis, Executive Director of the La Plata County Economic Development Alliance noted, broadband is virtually a utility for businesses and home-based employment and education now, no different than water, sewer, telephone service, electricity, and roads. Without widespread broadband access and adoption, the Colorado economy and students will not achieve their full potential. Areas without adequate internet access, rural or urban, have fewer opportunities for businesses to start and grow, and are less desirable places to live for employees, families, and sole proprietors. The expansion of broadband access is crucial for furthering Colorado's economic growth.

Two examples of how broadband affects a company's growth and economic development can be found in Southwest Colorado. The first firm, a multinational engineering and manufacturing firm, adopted broadband two years ago. As a result, they migrated their data to the cloud; integrated their computer systems; expanded remote monitoring, conferencing, and training; switched phone service to Voice-Over-Internet (VOIP), established electronic transfers for payment processing; and adopted e-commerce for vendors. The company is now saving well over \$150,000 per year in operation costs. A second company was recently formed to create a new technology specific for high speed internet. This firm now employs 700 people in two locations in Colorado. These jobs would not exist without adequate broadband infrastructure.

**9. Currently, many residents must travel long distances for employment or affordable housing opportunities. Access to the network will improve lives by providing alternatives to commuting – measured by less traffic on the already congested roadways, and more paychecks spent in local communities.**

For communities in Southwest Colorado, broadband internet access has become an indispensable tool. It enables access to a plethora of services, some examples include: remote backup capabilities, remote desktop management, remote education, telecommuting, virtual private server and desktop solutions, credit card and e-payment processing, and Google Apps for government - and this list is by no means exhaustive. Please see the paper cited as it also includes education, which is a major component of the SCAN project.

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<sup>4</sup> S.B. 12-157 A A Bill For An Act Concerning The Regulation of Telecommunications Service, And, In Connection Therewith, Enacting The "Telecommunication Modernization Act of 2012".

## PROJECT COSTS

The DoLA contract essentially had two line items; administration and construction. In some cases the costs could be clearly allocated to a specific community but in some cases the costs were regional in nature and could not be allocated to a specific community. An allocation formula based on the percentage of what each community was budgeted to receive of the total grant was developed. About 87% of the total budget was used for construction and 13% supported administration, as shown below.

SCAN Costs	Total Budget	% of Budget
Construction	\$ 3,555,395	87%
Administration	\$ 522,784	13%
<b>Total</b>	<b>\$ 4,078,179</b>	<b>100%</b>

There were a number of challenges to the accounting. The allocation of regional costs to each community was to some extent unknown and this made it difficult for local communities to budget for project costs. The final disbursements to each community are shown in the table below.

Community	Disbursements
<i>Town of Ignacio</i>	\$ 32,525
<i>City of Cortez</i>	\$ 1,133,315
<i>City of Durango/La Plata County</i>	\$ 686,405
<i>Town of Dolores</i>	\$ 48,581
<i>Town of Silverton/San Juan County</i>	\$ 192,402
<i>Town of Dove Creek /Dolores County</i>	\$ 150,809
<i>Town of Mancos</i>	\$ 65,701
<i>Town of Bayfield</i>	\$ 580,799
<i>Town of Pagosa Springs/Archuleta County</i>	\$ 647,356
<i>Contingency</i>	\$ 16,277
<i>\$40,000 moved from Admin to Construction</i>	
<b>Total Budget</b>	<b>\$ 3,554,171</b>

## COMMUNITY BROADBAND PROFILES

A major first step in the project was to identify which community anchor institutions (CAI) could potentially be connected to the network; their locations, and an estimate of their bandwidth needs. This involved producing maps of each community with the location of the community anchor institutions.

County	Community	# of locations identified	Anchor Institutions - Type of Organization Identified					
			Government	Public Safety	School	Health	Library	Other
Archuleta	Pagosa Springs	31	11	10	6	3	1	0
Dolores	Dove Creek	18	8	3	4	2	1	0
La Plata	Bayfield	25	10	10	4	0	1	0
La Plata	Durango	82	38	21	15	7	1	0
La Plata	Ignacio	17	5	6	4	1	1	0
Montezuma	Cortez	48	23	7	13	4	1	0
Montezuma	Dolores	15	8	2	4	0	1	0
Montezuma	Mancos	12	2	3	4	2	1	0
San Juan	Silverton	13	1	2	2	1	1	0
	<b>Total</b>	<b>261</b>	<b>106</b>	<b>64</b>	<b>56</b>	<b>20</b>	<b>9</b>	<b>0</b>

Using this information, a network design for each of the communities was made, although not all CAIs were connected during the course of the project. The construction of these networks resulted in costs specific to each community.

County	Community	Deployed		Fiber Distance in Feet*	Connecting Vaults	Total Build \$ Cost
		Aerial	Buried			
Archuleta	Town of Pagosa Springs / Archuleta County	X	X	26,067	12	\$ 647,356
Dolores	Town of Dove Creek / Dolores County		X	36,557	16	\$ 150,809
La Plata	Town of Bayfield	X	X	28,391	29	\$ 580,799
La Plata	City of Durango / La Plata County	X	X	42,240	N/A	\$ 686,405
La Plata	Town of Ignacio	X	X	7,446	4	\$ 32,525
Montezuma	City of Cortez	X	X	N/A	N/A	\$ 1,133,315
Montezuma	Town of Dolores	X	X	1,956	4	\$ 48,581
Montezuma	Town of Mancos	X	X	6,460	12	\$ 65,701
San Juan	Town of Silverton / San Juan County	X	X	5,624	17	\$ 192,402
	<b>Total</b>			<b>154,741</b>	<b>94</b>	<b>\$ 3,537,894</b>

\* The fiber installed in this project was a 72 fiber count in all cases except for Dolores County, which utilized a smaller count due to the distance involved

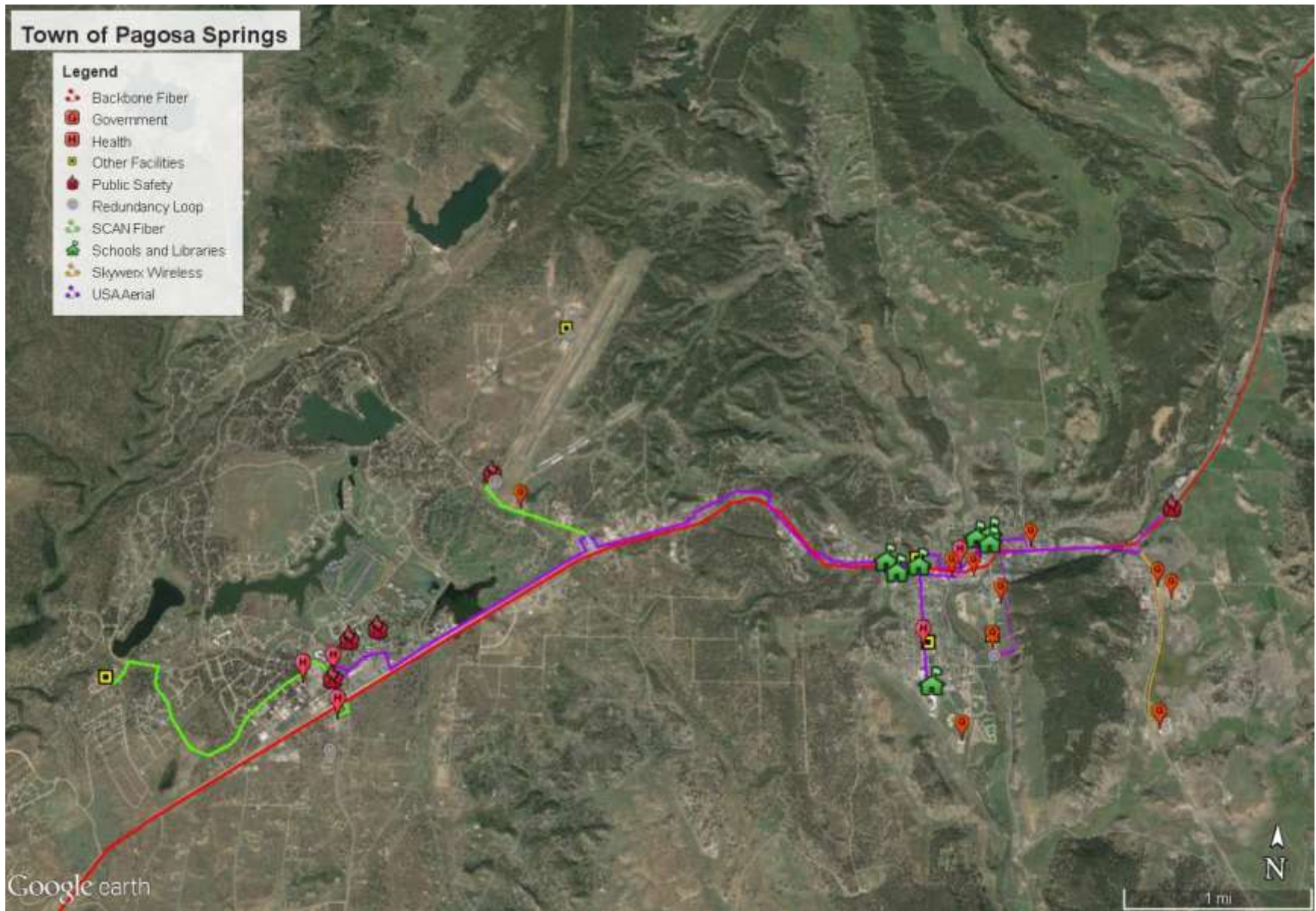
The following profiles were developed for each community to summarize what the SCAN Project has achieved using DoLA and matching funds. A short (12 minute) video on the profiles can also be seen at [Community Profiles](#).

## Archuleta County

### Town of Pagosa Springs

The SCAN project deployed about four miles (26,067 feet) of aerial and buried fiber, and twelve connecting vaults within the Town of Pagosa Springs, costing \$647,356. Pagosa Springs and Archuleta County partnered with local provider USA Aerial to share fiber so as to avoid over building and cut costs. Pagosa Springs and Archuleta County utilized a robust microwave system to build redundancy into their network. They also connected some distant government facilities with the microwave system. The extensive fiber route selected also gives the opportunity for the schools, library, Fire District, Pagosa Area Water and Sanitation District, Emergency Medical, the hospital, and the 911 Center to connect and purchase their services at an aggregated point at the hospital. This is efficient for vendors as well as all the entities can be serviced from a single location.

		Anchor Institutions - Type of Organization Identified					
	# of locations identified	Government	Public Safety	School	Health	Library	Other
Pagosa Springs	31	11	10	6	3	1	0



## Dolores County

### Town of Dove Creek

The Town of Dove Creek and Dolores County combined their available grant funds and partnered with Farmers Telephone and EAGLE-Net to purchase and install conduit and fiber that would connect the schools as well as the county courthouse. The Town of Rico opted out of the SCAN project.

	# of locations identified	Anchor Institutions - Type of Organization Identified					
		Government	Public Safety	School	Health	Library	Other
Dove Creek	18	8	3	4	2	1	0

The SCAN project in Dolores County deployed almost seven miles of fiber, sixteen connecting vaults, and cost \$150,809 to build. As a result of the SCAN funds bandwidth at the county courthouse went from 8 Mb to 20 Mb, while the schools went from 10 Mb to 30 Mb. The school connection was noted as a particularly important piece of the project. Ultimately, the County Road and Bridge Department as well as town offices will also be connected to the courthouse. Overall, SCAN has brought the potential bandwidth up to 100 Mb, though due to limitations imposed by SB 05-152 the town is not able to offer open access to its citizens. In retrospect, one of the County Commissioners thought the project would have gone smoother if they had integrated the partnerships more fully right from the initial planning stages, and of course, had more money to spend on infrastructure. However, "hard as it was, it did good stuff for the community."





## La Plata County

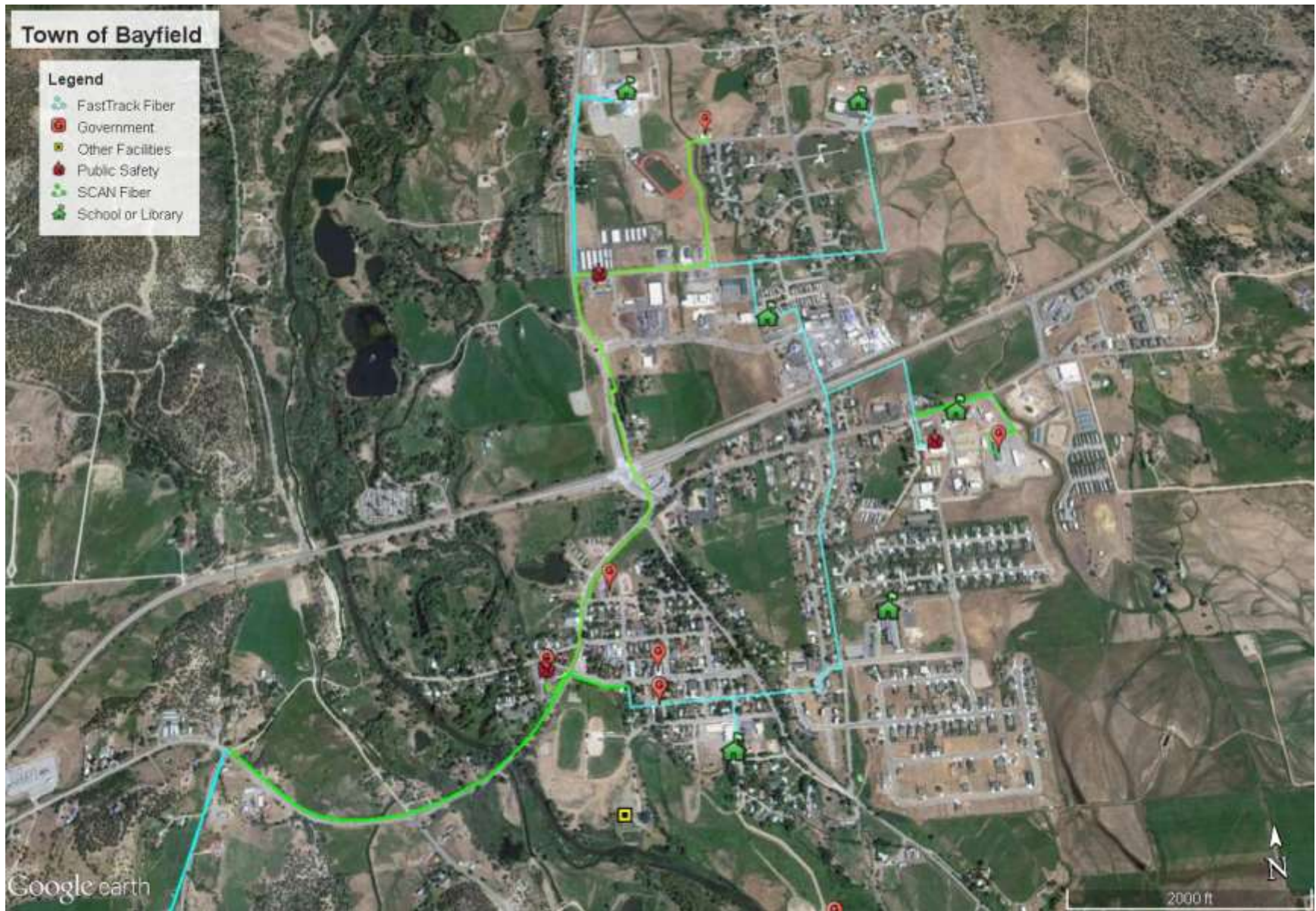
The fiber optic telecommunications infrastructure and demand for broadband services in La Plata County are concentrated in county offices and community anchor institutions located in municipalities. The County maintains partnerships with the Towns of Bayfield and Ignacio and the City of Durango to provide many government services. The County retains Information Technology (IT) personnel while working closely with City of Durango to improve the broadband services in the county by investing in infrastructure. A number of community anchor institutions were identified during the SCAN project.

	# of locations identified	Anchor Institutions - Type of Organization Identified					
		Government	Public Safety	School	Health	Library	Other
Bayfield	25	10	10	4	0	1	0
Durango	82	38	21	15	7	1	0
Ignacio	17	5	6	4	1	1	0

## Town of Bayfield

The SCAN project deployed more than five miles (28,391 feet) of aerial and buried fiber, and twenty-nine connecting vaults within the Town of Bayfield, costing \$580,799. Bayfield partnered with a local provider (FastTrack) to share fiber so as to avoid over building and to cut costs. Bayfield also utilized some wireless to connect three additional town facilities. La Plata County has joint facilities with Bayfield and as such both entities gained efficiencies in cost by connecting the joint facilities by fiber. The route selected affords the opportunity to the public library, Upper Pine Fire District, schools and local business districts to attach and acquire services from vendors.

*“The SCAN project has benefited Bayfield School District immensely. Our internet bandwidth has increased from 6 Mb to 100 Mb while decreasing costs by approximately \$400 per month! Now that service is tied directly to our ISP, we can easily (and more affordably) address future bandwidth needs. Our new capacity has allowed us to improve access across the entire district. This is important as we strive to deliver 21st century skills to our students here in Bayfield. Thank you!”* Bill Bishop – Director of Technology, Bayfield School District

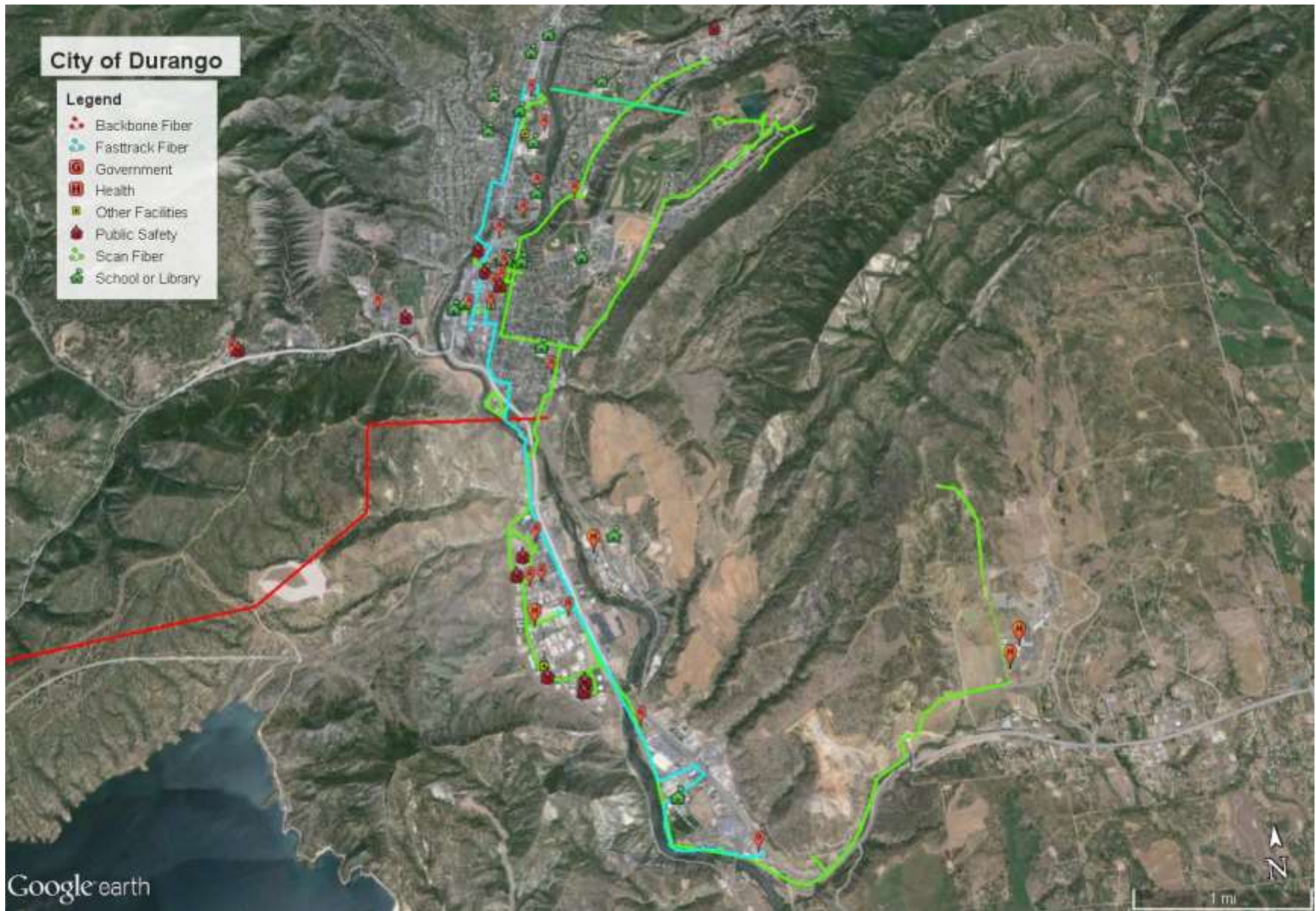


## City of Durango

The City of Durango is constructing fiber and wireless infrastructure to implement a private, intra-community network. Durango does not plan to operate a comprehensive, citywide network but will invest in and provide dark fiber to private service providers. The SCAN project deployed about eight miles of aerial and buried fiber within the City of Durango, costing \$686,405. The City of Durango and La Plata County used the grant funding to run fiber to the following locations: La Plata County Jail and Sheriff's Office, Division of Motor Vehicles, City Data Center in Bodo Industrial Park, City Water Treatment Plant complex, City Transit Center, Chapman Hill ice rink and ski hill, and Riverview Elementary School (nearing completion). Each of these locations has commercial dark fiber available between the La Plata County Courthouse (aggregation point) and the endpoints mentioned above. Four ISPs are utilizing dark fiber leases totaling about 4.5 miles of fiber. The ISPs have been able to increase bandwidth speeds to many businesses and residences by over ten times through grant-funded dark fiber.

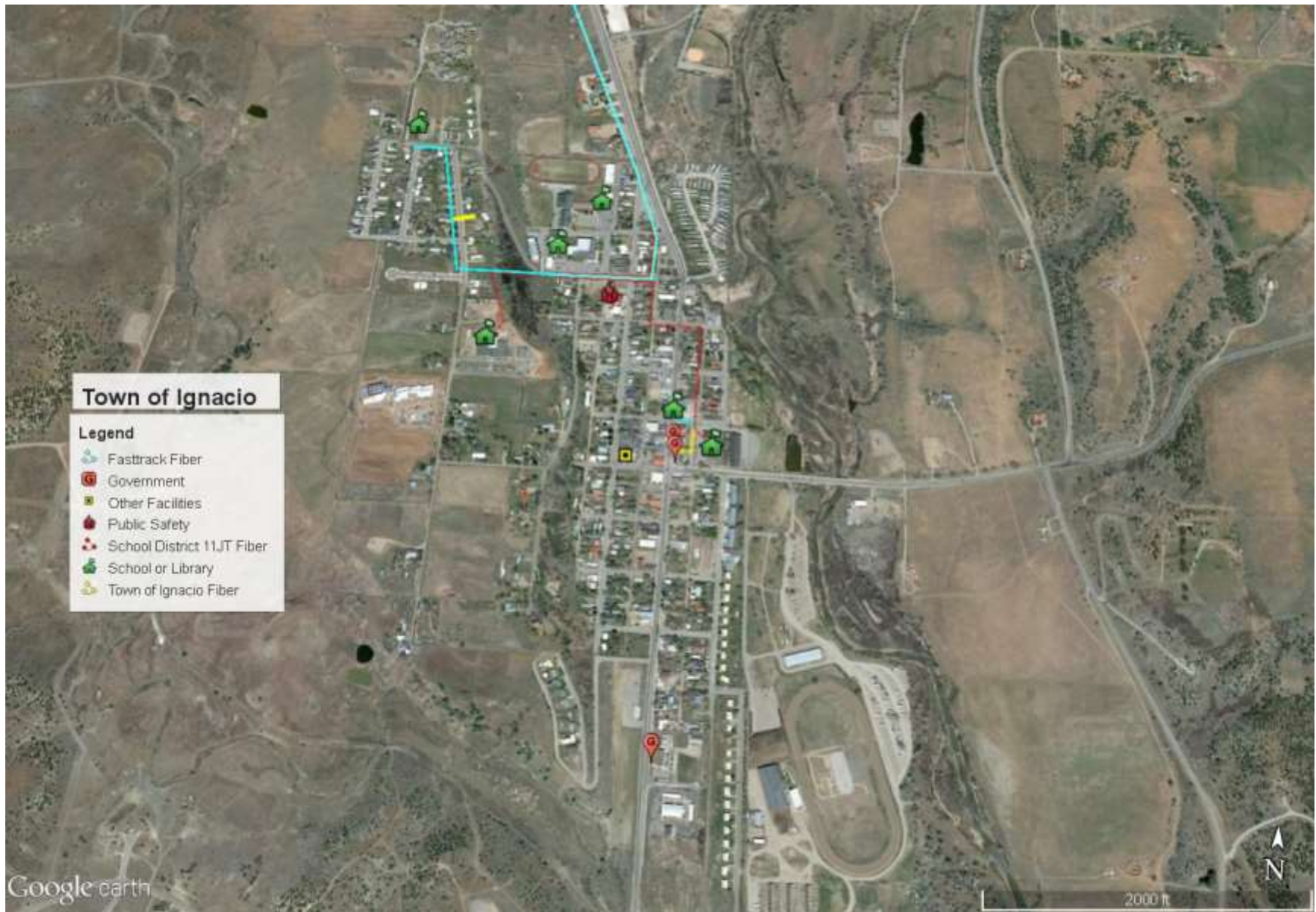
Conduit was also installed in a number of locations. Mercury Village development for connecting City SCADA sanitary sewer lift stations and commercial dark fiber to the Mercury office building. Other routes include the Water Treatment Plant complex to the Animas River, which passes Riverview Elementary School and Florida Road to create a fiber ring for the water plant redundancy. Other conduit along Main Avenue and side streets may provide dark fiber for businesses, Wi-Fi in the downtown and City parks in the future. These fiber and conduit projects have provided new fiber connectivity to underserved government and educational locations, fiber redundancy to strategic City and County locations, dark fiber for commercial lease and strategically important conduit installation for future fiber connectivity.

The City of Durango, La Plata County, Durango School District, and Mercy Regional Medical Center hope the implementation of City-owned dark fiber on open access principles will allow additional private service providers to enter the market and make telecommunications services more competitive in the area. This is now being realized as Brainstorm Internet leases SCAN dark fiber at the base of the Hillcrest/Skyridge neighborhoods. They serve 57 residential customers there, and provide up to 20 Mb at \$2.75 per Mb.



## Town of Ignacio

The SCAN project helped deploy almost one and a half miles (7,446 feet) of aerial and buried fiber, and four connecting vaults within the Town of Ignacio, costing \$32,525. In Ignacio, community fiber optic infrastructure is owned by the school district and connects the majority of community anchor institutions. The remaining institutions are within several hundred feet of existing conduit, and a small fiber project was completed in spring 2011 to connect the Ignacio Library to this infrastructure. Broadband speeds at the library increased from 10 to 50 Mb, with no additional costs. The Town Public Works Shop is now connected and is able to access the Town's servers and data, thanks to connectivity from the SCAN project. FastTrack owned fiber provides the only connectivity out of the Town on fiber that runs to Durango.



## Montezuma County

The fiber optic telecommunications infrastructure and demand for broadband services in Montezuma County are concentrated in the municipalities of the county, including Cortez, Dolores and Mancos. The majority of county offices and community anchor institutions are located in the City of Cortez, which serves as the county seat. The County retains a small Information Technology (IT) staff to support county-owned equipment and applications, and contracts with the City of Cortez for more advanced telecommunications services and network support. A number of community anchor institutions were identified during the SCAN project.

		Anchor Institutions - Type of Organization Identified					
	# of locations identified	Government	Public Safety	School	Health	Library	Other
Cortez	48	23	7	13	4	1	0
Dolores	8	2	4	0	1	0	
Mancos	12	2	3	4	2	1	0
Montezuma County	75	33	12	21	6	3	0

## City of Cortez

The City of Cortez constructed fiber and wireless infrastructure to implement a private, intra-community network, prior to SB05-152 going into effect. Work was already underway in Cortez when the DoLA grant funds were awarded, however funding from the SCAN project totaled \$1,133,315. Cortez operates a multi-service, open network that brings fiber directly to homes and businesses and provides transport services for private service providers to reach locations throughout the City. The network already serves City and County facilities, the local hospital, fire district, and school district. The first round of the project significantly increased the linear feet of fiber in the city and installed necessary electronic equipment to feed a Gigabit Passive Optical Network (GPON) as shown in green on the map.

You can also hear Rick Smith, the Director of General Services of the City of Cortez, talk about the SCAN project in a [podcast](#) with Muninetworks.org.





Fiber connects the city to the backbone infrastructure owned by Tri-State Generation and Transmission. The construction included all underground service, including conduit, fiber, splice locations and handholds, as well as electronics at the City head end and at the customer premise. Of the 250 businesses able to be served by the project, 172 purchased a fiber drop, and 62 are taking service from the private service providers on the network. The open access network has seven private service providers utilizing the network to bring services.

The City of Cortez has six partners using the Open Access system to provide service on the fiber to the business project. These include Farmers Telephone, FastTrack, Brainstorm Internet, Cedar Networks, Velocity Net, and Data Safe Services. These partnerships are enabling better services for residents and businesses in Cortez. The local service providers have invested infrastructure to provide advanced services. These include: investment in carrier grade public phone switches, increased upstream connectivity, increased local cross connect capability, contacting for larger internet connections, expanded their local labor pool, and upgraded their office head end equipment and capabilities. These advancements have resulted in a 5.5 times improvement in capacity for the same dollars spent for services.

Businesses and citizens in currently un-served areas have been asking for service when it becomes available, and are requesting to be put on a list for service. Many local businesses are waiting on their existing contracts to expire before they can move services to the network. The SCAN project has aggregated services at a price point equal or better than DSL pricing from the incumbent provider. The internet connections went from 45 Mb for \$3,000 per month to 250 Mb for about the same price. This is a 5.5 times increase in bandwidth for the same dollars.

Forethought (formerly Brainstorm Internet) plans to expand its service offerings and are now able to offer 100 Mb service because of the City of Cortez fiber network upgrades.

*“Our first customer for 100 Mb service is up and they are at full speed now (100/100) thanks to help from the City. This customer can now participate in online video courses from parent company that they could not do before. Another immediate advantage is the ability to upload photos that now take drastically less time. They have also upgraded to an IP based credit card station which is more modern and much faster. The customer has improved service at less cost. Their \$800/mo bill for phone and internet (1.5 Mb!) has been reduced to \$520/mo for basically the same service except internet speed is 60 times faster.”* Eric Hager - Vice President of Business Development, FORETHOUGHT

*“The Unlimited Learning Center has gone from a 4.5MB T1 to a 50 Mb connection, which has enabled us to double the amount of live video classes we can receive and/or broadcast. There is no way we could be doing the things we are doing now without the city's fiber network. There are days that we have a continuous traffic of over 12 Mb now. There is no way we could be reaching out to places like Chevak, Alaska and the Pacific Islands without the fiber network. We are currently developing plans to reach out to places like American Samoa and the Navajo Nation with more classes and cloud connectivity, which again would not be possible without the bandwidth provided by the City's network.*

*I can say that the connectivity that we have from the city has enabled us to broadcast classes to school districts and adult education centers around the state and around the country. For a local example, we provide professional staff development classes through Interactive videoconferencing to Pagosa, Ignacio, and Durango, and Towaoc. For these classes, we partner with Adams State College and Utah State University, so that our classes all carry graduate credit for the teachers. ULC also broadcasts certificated job training classes to sites throughout Colorado, various school districts on the Navajo Reservation, to the Ute Mountain Ute and Southern Ute Reservations, and to the Chu'pik Indian Reservation in Alaska. Next year, we will be broadcasting classes to two more school districts in Alaska.*

*As a receiving site, Unlimited Learning Center receives approximately 42-45 classes per semester from Utah State University, ranging from certificated training classes to Masters degree level classes. Next school year, we will also be receiving college classes from San Juan College in Farmington and from Navajo Technical University in Crownpoint, New Mexico. We are emphasizing job training in natural gas and oil production and in the medical career areas. Our students and community residents have found that IVC classes are the most efficient and cost-effective method for receiving advanced educational opportunities!*

*Next year, we plan to offer classes through "cloud access" capability, involving the use of mobile devices to access classes. We will be able to offer educational opportunities to students through their individual devices, anytime and anywhere, rather than being limited to just a classroom environment. We are currently incorporating cloud access into three grant proposals.” Brian Weber - Network & Systems Administrator, Unlimited Learning Center, Cortez, CO*

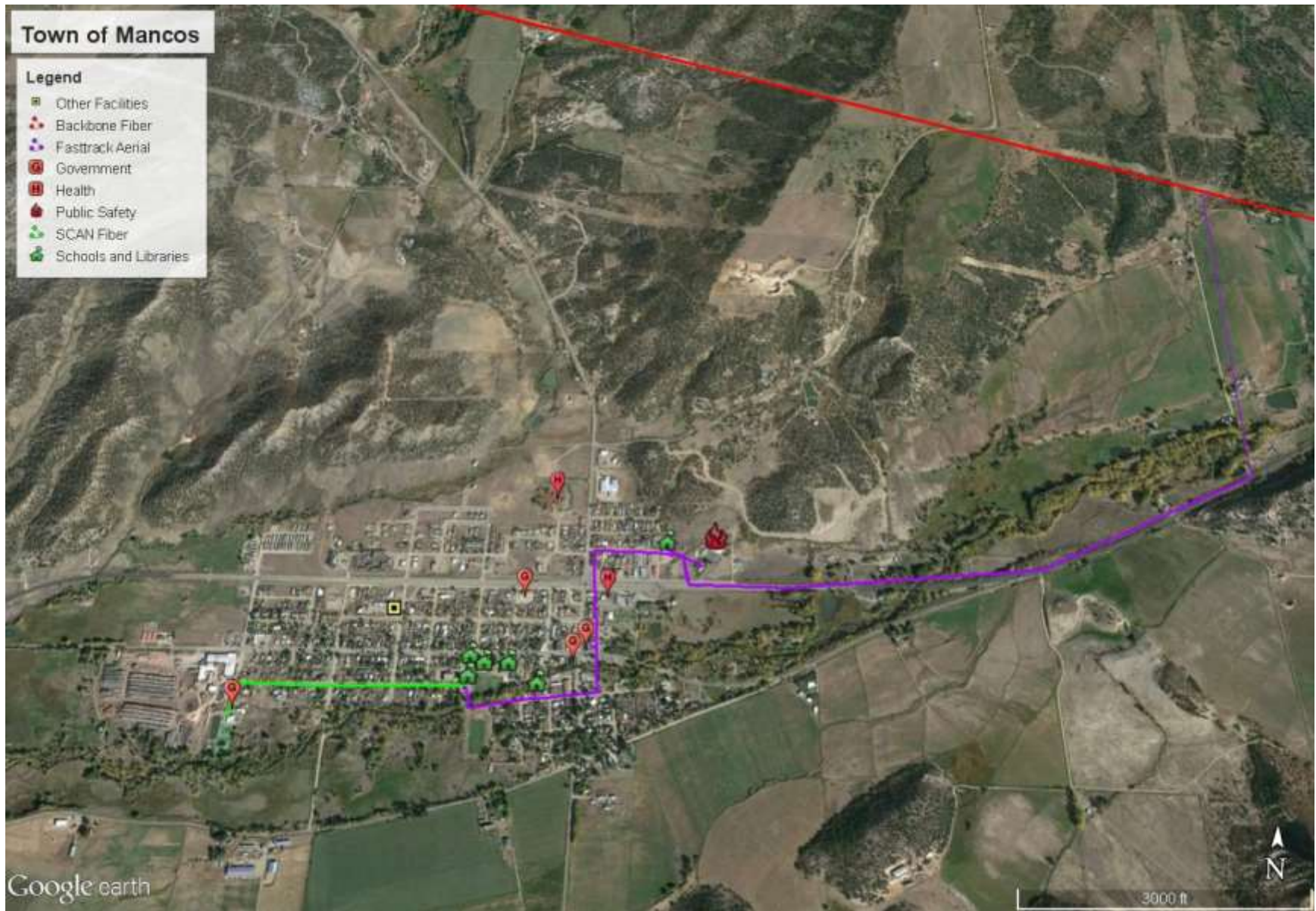
## Town of Dolores

The SCAN project deployed almost 2,000 feet of aerial and buried fiber, and four connecting vaults within the Town of Dolores, costing \$48,581. Government facilities, community anchor institutions, businesses and residents of the Town of Dolores previously received most services via wireless infrastructure. There is no community-owned wireless or fiber infrastructure in Dolores, and the Town does not have its own IT department. Dolores partnered with a local provider (FastTrack) to share fiber so as to avoid over building and cut costs. Aerial fiber connects the Town to the backbone infrastructure owned by Tri-State Generation and Transmission which runs south of Dolores.

## Town of Mancos

The SCAN project deployed almost 6,500 feet of aerial and buried fiber, and twelve connecting vaults within the Town of Mancos, costing \$65,701. The Town of Mancos owns microwave equipment that provides services from the Town Hall to the school district, fire district, and library. Mancos partnered with a local provider (FastTrack) to share fiber so as to avoid over building and cut costs. Aerial fiber connects the Town to the backbone infrastructure owned by Tri-State Generation and Transmission which runs north of Mancos.





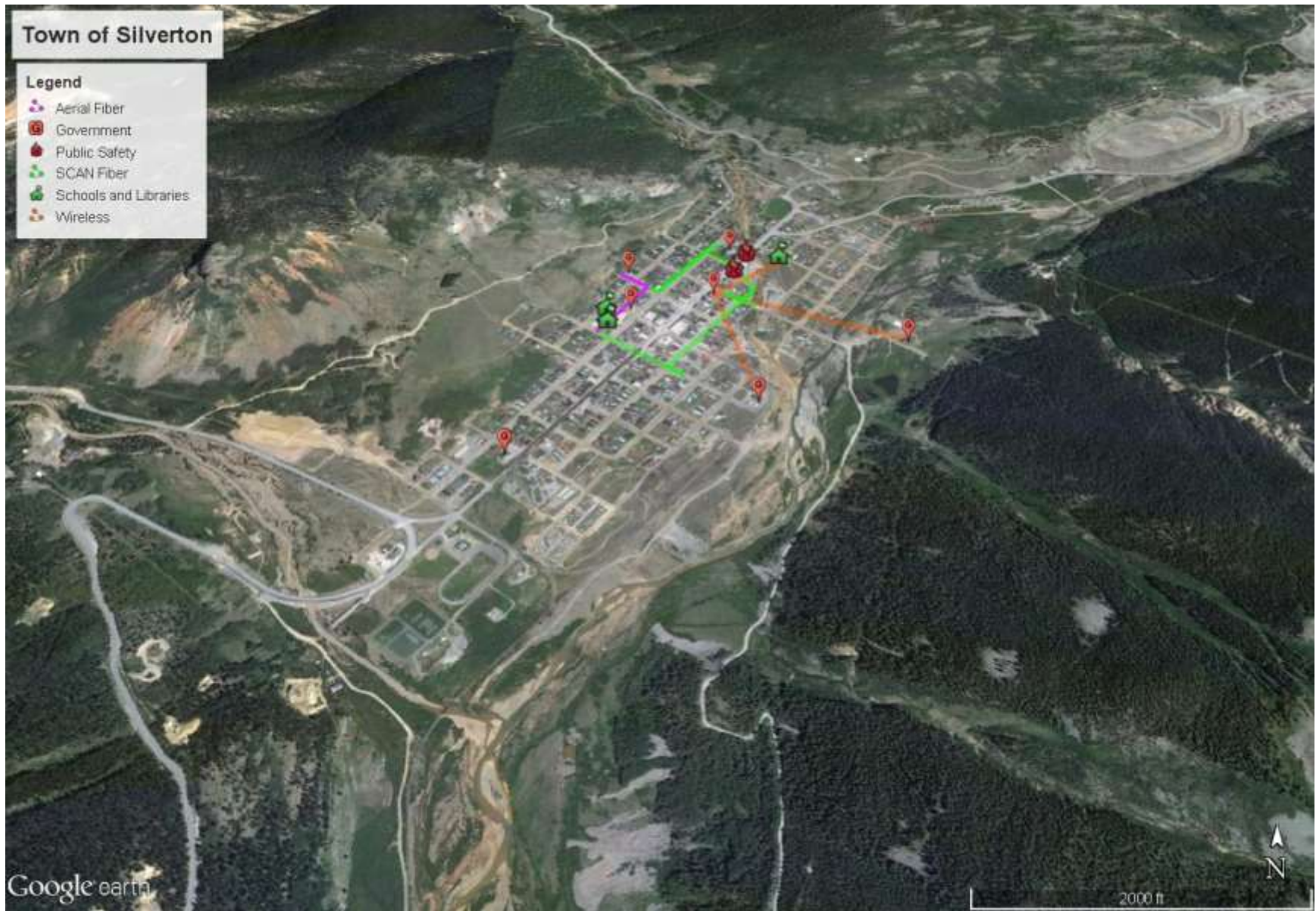
## San Juan County

### Town of Silverton

The Town of Silverton is the only community in San Juan County. Because of its geographic isolation, the town has severely limited telecommunications connectivity to the rest of the region. The Town is connected to the nearest fiber spur, which runs north from Durango to Cascade Village, via microwave technology. Private service providers are reluctant to invest in fiber connectivity into Silverton from the north and south because of the high cost of construction through the mountains. Within the Town, Century Link has run fiber from its facility to the town’s school, library and post office. This fiber run does not provide service for the majority of community institutions, which are served via wireless technology.

		Anchor Institutions - Type of Organization Identified					
	# of locations identified	Government	Public Safety	School	Health	Library	Other
Silverton	13	1	2	2	1	1	0

The SCAN project deployed almost one mile (5,624 feet) of aerial and buried fiber, and seventeen connecting vaults within the Town of Silverton, costing \$192,402. Silverton and San Juan County selected a route that creates opportunities for vendors to get service to businesses through strategically placed vaults. Town and County officials planned for a future lighting project and placed the conduit in the ground to avoid additional excavation of Town/County rights-of- way. The vaults used in this deployment are street rated and were placed in the streets for easy future access to businesses on either side.





## LESSONS LEARNED

Ed Morlan, the Responsible Administrator for the SCAN project, has provided a detailed report on lessons learned that should be essential reading for other communities considering a project such as the SCAN. His report is available for review at the [SWCCOG](#) website.

Executive Director Miriam Gillow-Wiles wrote in an article for the Colorado Office of Information Technology:

*“Although the SCAN project is a success, there were definite hurdles to overcome. If forced to do this over again, we would better outline the needs and wants of the local governments. Additionally, we would ensure cooperation and communication with the local providers to initially forge stronger public-private partnerships and to delineate roles prior to beginning construction. As this was a new idea for the vast majority of communities and counties, better (non-technical) education about equipment, infrastructure, and the operations of the SCAN project for local government administrators (especially those communities who do not have dedicated IT staff) would help with communication as to the importance and the impact of the project across staff and elected officials. Finally, the SWCCOG could have and should have communicated with the local media for comprehension of the public as to the benefits of the project.”*

## GOING FORWARD

Now that the SCAN network is in place the SWCCOG has developed a cost sharing model to operate and maintain the network. A system of fees has been developed and will be negotiated on a bi-annual basis. These fees include:

### **Ramp Fee (Connectivity Fee) \$75.00 per month or \$900.00 per year**

- Fee covers Network maintenance (staff hours and fiber).
- Ramp Fee is to be paid by all “original SCAN participants,” consisting of member organizations or other entities who use(d) the DoLA funds to build or connect to the SCAN.
- Ramp Fees will be paid by any original SCAN participants that connect to the SCAN Network.
- This fee will be re-evaluated bi-annually to determine what is necessary for maintenance. At such a time that this fee is no longer needed to maintain the system,

the fee will be reduced or eliminated.

**Internet Bandwidth Usage - \$2.50 dollars per Mb**

- Fee covers cost of Internet & Transport (port fees).
- SCAN General Manager will determine usage fee per term of lease based on real cost.

**Internet Admin Fee - \$1.50 Dollars per Mb**

- Fee covers cost of routers & equipment.

**Leased Assets**

Revenue from fiber IRU's with vendors. If the member organizations wish that agreements be developed, and services researched or developed or administered by SCAN staff, an administrative fee will be required. Fees paid for SCAN administration will be based on 5% of revenue, with additional fees negotiated as needed on the bi-annual fees resolution schedule.

**E-Tics Software \$8400.00 to be shared by the City of Cortez and Durango/La Plata County**

- Direct payment for service from SWCCOG Members.

The SWCCOG will continue to work with member communities to enable shared purchasing of software, budgeting for licensing of their equipment and repairs on infrastructure.

In closing, the SWCCOG is very proud of what the SCAN project has achieved - namely increased broadband capacity at lower costs, and facilitated a spirit of cooperation with service providers who also have much to gain from an open access network. The region looks forward to more success stories as governments, businesses and private citizens take advantage of the network.