Commission Memorandum

REPORT TO: Honorable Mayor and City Commission

FROM: Brit Fontenot, Economic Development Director
     David Fine, Economic Development Specialist

SUBJECT: The Bozeman Fiber Initiative Project Overview and Policy Direction

MEETING DATE: December 15, 2014

AGENDA ITEM TYPE: Action

RECOMMENDATION: Receive the staff presentation, provide comment and questions, and receive public comment.

Direct Community and Economic Development staff to return to the Commission with a proposed Growth Policy amendment incorporating elements of the Bozeman Fiber Master Plan into the City's Growth Policy.

SUGGESTED MOTION: I move to direct Community and Economic Development staff to return to the Commission with a proposed Growth Policy amendment incorporating elements of the Bozeman Fiber Master Plan into the City's Growth Policy.

BACKGROUND:

In May, 2013, with the support of the Bozeman City Commission (Commission Resolution 4434) the City established the Broadband Steering Committee (BSC). (Attachments 1, 2 & 3) The BSC is composed of technology sector professionals, economic developers, telecommunications industry professionals, financial services professionals and local government officials. Since July, 2014, members of the BSC have worked with Design Nine, a nationally recognized broadband planning firm to, in the words of Commission Resolution 4434, “bring fast, reliable, and affordable broadband service to Bozeman and the region in furtherance of the City’s economic development goals.”

High-performance broadband is essential infrastructure for developing Bozeman’s economy. Technology firms, film makers, medical providers, banks, businesses, and startups require fast, reliable, redundant, and affordable connections to their clients. Educational
institutions increasingly depend on broadband to provide high quality instruction and meet standards for integrating technology into the classroom to prepare students for careers. Through a public – private partnership, the Bozeman Fiber Initiative seeks to increase access to redundant fiber and lower the cost of broadband for business by stimulating competition for private sector service delivery through public and private infrastructure investment.

The project team, convened by the City of Bozeman, the Broadband Steering Committee, and the Economic Development Council, was tasked to explore the feasibility of developing a community-owned, high-performance broadband network for Bozeman.

Community Partners

The master planning effort received widespread support from community organizations that see next generation fiber-optic connectivity as crucial infrastructure for economic development. The Bozeman Area Chamber of Commerce, Bozeman Deaconess Hospital, Northwestern Energy, Bozeman Public Schools, Downtown Bozeman Tax Increment Finance (TIF) District, North Seventh TIF District, and the City of Bozeman all provided funding for the master plan. The City also received grant funding from the Big Sky Economic Development Trust Fund through Prospera Business Network and the U.S. Economic Development Administration through the Northern Rocky Mountain Economic Development District. The total cost of the master planning process is $70,000.

Community Fiber Master Plan Development

The Broadband Steering Committee envisions a public-private partnership model in which broadband providers, anchor businesses, School District 7, the City of Bozeman, and Bozeman Deaconess Hospital and local financial institutions collaborate to fund and construct a new community fiber optic network. The final master plan will investigate and propose options for public-private partnerships, viable business and financing models, and potential build plans. It will also explore regulatory options that can speed the deployment of broadband throughout our community. Given that broadband is essential infrastructure, staff recommends including elements of recommendations from the Bozeman Fiber Master Plan in the City’s Growth Policy to guide the City’s long-term approach to enhancing its telecommunications infrastructure.

Commission Update and Direction

On Monday, December 15th the Commission will be asked to consider two items: 1) receive the update on the master plan from City staff and members of the Design Nine team, ask questions and take public comment; and 2) consider directing staff to return on February 9th with a proposed Growth Policy amendment (GPA) incorporating elements of the Bozeman Fiber Master Plan into the City’s growth policy.

UNRESOLVED ISSUES: If, as recommended, the Commission directs Community and Economic Development staff to return with an appropriate GPA, staff intends to return to the Commission on February 9, 2014 with
a recommendation for adoption of a GPA and a recommendation for adoption of the Bozeman Fiber Master Plan.

**ALTERNATIVES:** As determined by the Commission.

**FISCAL EFFECTS:** None identified at this time. If the Bozeman Fiber Master Plan is adopted, recommendations included therein outline funding strategies for network engineering, fiber deployment, network operations/maintenance and governance.

**Attachments:**

1. May 6, 2013 Memo and materials supporting the Broadband Steering Committee;
2. Approved Bozeman City Commission Resolution 4434 supporting the Broadband Steering Committee;
3. May 6, 2013 City Commission Meeting Minutes;
4. Approved Gallatin County Resolution 2013-138 supporting the Broadband Steering Committee;
5. Bozeman Fiber Initiative Broadband Needs Assessment; and

*Report prepared on December 9, 2014*
Commission Memorandum

REPORT TO: Honorable Mayor and City Commission
FROM: Brit Fontenot, Economic Development Director
SUBJECT: Resolution 4434 supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable broadband internet services to the region in furtherance of the City’s economic development goals.

MEETING DATE: May 6, 2013
AGENDA ITEM TYPE: Consent
RECOMMENDATION: Approve Resolution 4434 supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable broadband internet services to the region in furtherance of the City’s economic development goals. (ATTACHMENT 1)

BACKGROUND:

The purpose of the Broadband Steering Committee (the “BSC”) is to participate and assist in setting the direction and priorities for the local and regional communities regarding high-speed broadband and fiber optic metro networks.

The BSC’s mission is to ensure fast, reliable and affordable broadband internet services to the region in furtherance of local and regional economic development goals and priorities.

Originally organized as a partnership between Montana State University, the City of Bozeman and the Northern Rocky Mountain Economic Development District (the “NRMEDD”), the BSC endeavors to raise the awareness of broadband infrastructure in the region and discuss the importance of high-speed broadband connectivity as an economic development tool in support of the expansion of the technology sector which could result in the creation of additional high to mid-paying jobs in the region.

The role of the BSC is one of guiding the community on the issue of broadband infrastructure and connectivity and to ensure that questions and concerns as they relate to broadband and economic development are being adequately addressed, documented and
resolved. The BSC works closely with MSU, the City, NRMEDD and local businesses to document existing broadband services, understand existing business needs, identify broadband deficiencies, if any, and document this information for the establishment of a broadband strategy for the area. The BSC also serves to educate its members and the public on broadband and interconnectivity issues with the goal of enabling members to freely discuss these services with peers as needed and provide a forum for these discussions.

The composition of the BSC includes a committee chair, Dr. Dewitt Latimer, Montana State University’s Chief Information Officer and 13 members from the public and private sectors in Gallatin and Park Counties. The membership includes qualified professionals from the technology and communications sectors. (ATTACHMENT 2) It is intended that the BSC leverage the experiences, expertise, and insight of the committee members in order to examine and champion the broadband needs of the region.

The BSC is seeking City Commission support for the work described above. Support for the BSC is consistent with adopted Commission priorities (No. 1) and the City’s adopted economic development plan’s goals and strategies (No. 2). (ATTACHMENTS 3 and 4) Resolution 4434, if approved, provides legitimacy and credibility to the purpose and mission of the BSC.

UNRESOLVED ISSUES: None identified at this time.

ALTERNATIVES: As determined by the Commission.

FISCAL EFFECTS: None identified at this time.

Attachments:

1. Resolution 4434 supporting the Broadband Steering Committee; and
2. Broadband Steering Committee Biographies;
3. The City Commission’s Adopted FY 13-14 Priorities; and

Report prepared on April 19, 2013
COMMISSION RESOLUTION NO. 4434

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF BOZEMAN, MONTANA, EXPRESSING SUPPORT FOR THE BROADBAND STEERING COMMITTEE AND THEIR EFFORTS TO BRING FAST, RELIABLE AND AFFORDABLE BROADBAND INTERNET SERVICES TO THE REGION IN FURTHERANCE OF THE CITY’S ECONOMIC DEVELOPMENT GOALS.

WHEREAS, the City of Bozeman and its citizens support efforts to strengthen the economic vitality of Bozeman and the surrounding area; and

WHEREAS, the Bozeman City Commission identified economic development as a high priority; and

WHEREAS, the City of Bozeman’s 2009 Economic Development Plan’s first goal is to support the expansion and retention of existing businesses and economic sectors that will continue to strengthen and diversify the economy and create higher paying jobs in Bozeman and the surrounding area; and

WHEREAS, the City of Bozeman’s 2009 Economic Development Plan’s second goal is to maintain and upgrade infrastructure to support current and future needs of business; and

WHEREAS, the City of Bozeman’s Economic Development Council has discussed the importance of broadband internet service to accomplishing the aforementioned goals; and

WHEREAS, the Broadband Steering Committee has determined that the lack of affordable, reliable and fast broadband internet service in the region could be a limiting factor in the economic growth of high-tech and other sectors.
NOW, THEREFORE, BE IT RESOLVED by the City Commission of the City of Bozeman, Montana, that the City supports efforts by the Broadband Steering Committee to bring fast, reliable and affordable broadband internet service to Bozeman and the surrounding area and will assist in those efforts when appropriate.

PASSED AND APPROVED by the City Commission of the City of Bozeman, Montana, at a regular session thereof held on the _____ day of ________, 2013.

______________________________
SEAN A. BECKER
Mayor

ATTEST:

______________________________
STACY ULMEN, CMC
City Clerk

APPROVED AS TO FORM:

______________________________
GREG SULLIVAN
City Attorney
Anthony Cochenour has twenty years of network, telecommunications and software development experience. In late 1997 he created a successful regional ISP, PrimeMedia, which served MT and WY and in 1999 became the CTO of BridgeBand Communications. While at BridgeBand he led efforts to expand and deploy critical business-focused broadband infrastructure throughout MT, ID and WY. In 2004 he took on the challenge of modernizing and expanding global data center and voice networks for RightNow Technologies in support of their CRM platforms. In his tenure at RightNow he led efforts to deploy seven data centers and over a dozen international voice POPs which have since served billions of customer interactions globally. In 2008 he accepted an engineering position with Cisco Systems providing design and implementation support for customers primarily in the western United States. Since then, he has received numerous awards including Cisco’s Engineer of the Year in 2011. He maintains a focus on data center, virtualization and security technologies, which have become so critical for modern application platforms.

For the past ten years he has maintained his status as a certified, court-recognized digital forensics expert specializing in Internet and communications-related cases. He is an active member of the FBI’s InfraGard program, the Montana chapter of the ISSA and actively volunteers to help educate students and families on topics such as online safety and cyber bullying. Most recently, he is leading a software security startup company headquartered in Bozeman that’s focused on bringing, and keeping, high tech jobs in MT.

Dr. Doug Gale has extensive experience designing and building wide area networks. 1986 he wrote the original proposal to the National Science Foundation suggesting a national network made up of a backbone network linking regional networks and actively participated in the creation of what later became known as the Internet. The regional network that he founded, MIDnet, was the first fully operational Internet Service Provider (ISP) in the world and until 1992 was the largest source of Internet traffic in the world. In 1990 and 1991 he served as a program office at the National Science Foundation where he managed the NSFnet, the immediate precursor to today’s Internet. In 1991 he received the Directors Award for Program Officer Excellence. While at the NSF he also prepared and reviewed material for the White House Office of Science and Technology Policy, the Office of Technology Assessment, and the U.S. Congress regarding the High Performance Computing Initiative and the National Research and Education Network (NREN).

In 1995, he wrote the technical requirements document for Internet2 (a high performance Internet for the research community) and participated in its creation as a member of the Abilene Executive Committee. Shortly afterwards he was the architect of the Washington Research and Education Network which later became the Mid-Atlantic Crossroads (MAX). In 2000 he became an early advocate for consortium owned and operated high performance fiber optic networks and subsequently designed three, one serving the “Five Colleges” in western Massachusetts in 2001 (http://www.fivecollegenet.com/network.htm), one in the State of Ohio in 2002 (http://www.oar.net), and one in Maryland in 2010, (http://www.mdren.net).
Along the way Dr. Gale has served as a tenured Professor of Computer Science and Physics, CIO at two research universities, CEO of an Internet Service Provider, President of a Consultancy, and Founder and President of the Internet Legacy Institute (www.internetlegacyinstitute.org).

**Robert (Rob) Gilmore** is Executive Director of the Northern Rocky Mountain Economic Development District. He provides economic development products to Gallatin and Park Counties and serves a 27 member Board of Directors and a seven member Executive Committee. Rob is also Chairman of Solution Mountain (SMI), an Intelligent Network that is dedicated to helping U.S. communities analyze their business needs, measure economic impacts and develop strategies for business expansion. Previously, Rob was founder/CEO of Globe-1, Inc. The company provided e-commerce solutions to U.S. domestic and international markets. Before its sale to Onvia, Inc. in 2000, the Globe-1 system was one of the largest small-business trade matching system in the US with linkages to all major US cities, more than 650,000 supplier companies and a dozen international markets. He is a recipient of the Ford Foundations award for *Innovations in American Government*, and the Council of State Government’s *Award for Innovation*.

**Brit Fontenot** is the Director of Economic Development and Community Relations for the City of Bozeman, Montana. He has worked for the Bozeman community for the past 7 years. Prior to coming to the City of Bozeman, Mr. Fontenot served 5 years (2000 – 2005) with the United Nations Compensation Commission at the UN European Headquarters in Geneva, Switzerland. While serving at the UN Mr. Fontenot assisted a team of legal experts in the processing of claims and payment of compensation for environmental losses and damage suffered as a direct result of Iraq's 1990-1991 unlawful invasion and occupation of Kuwait.

Mr. Fontenot has served the citizens of Bozeman since 2006. He has worked in various capacities for the Bozeman community, first as City Clerk then as Assistant to the City Manager with a focus on neighborhoods, then as Assistant to the City Manager with a focus on economic development and is currently the Director of Economic Development and Community Relations. Mr. Fontenot engages both public and private sectors to collectively and creatively offer solutions to many of the pressing economic issues in and around Bozeman, i.e. job creation, employment sector diversification and access to business related information and resources. Additionally, Mr. Fontenot provides support to local business by aiding in the navigation of various local regulatory processes.

Mr. Fontenot holds a B.A. degree in Political Science from the University of Louisiana in Lafayette, Louisiana and earned an M.A. degree in History from Montana State University in Bozeman.

**Lester Jerome** is the Manager of Information Systems at Bozeman Deaconess Health Services. Bozeman Deaconess is the primary health care facility for Gallatin county and surrounding areas. Lester manages all aspects of IT at BDHS including: staff, hardware platforms, applications, telecommunications, and external connectivity. The external connectivity portion is the reason Lester is interested in participating in broadband initiatives and activity in any process that can strengthen these capabilities in Southwest Montana.
Lester has an Associate’s Degree from Fresno City College, a Bachelor’s Degree in Business Administration from California State University, Fresno, and an MBA from Texas Woman’s University. Lester has 25 years’ experience in healthcare IT in both the facility and vendor side of the business.

Matt Johnson was born in the Denver, CO area and graduated from Colorado State University in 1990 with a business marketing degree, and from Pacific Coast Banking School in 2008. Matt relocated to Bozeman in 1997 as Small Business Banker with U.S. Bank then started his career with First Interstate Bank in 1999. Since joining First Interstate Matt has held successive leadership roles in the company and is currently Vice-President and Regional Commercial Loan Manager. Matt is active in the local community as Chair Elect of the Bozeman Area Chamber of Commerce, CAP Mentor and through his church. Matt and his wife Laura, a full time student at Montana State University, have three daughters attending Bozeman area public schools.

Dr. Dewitt Latimer serves as the Enterprise Chief Information Officer for MSU System as well as its flagship university in Bozeman. Dr. Latimer is responsible for the IT experience of students, faculty, and staff, and for enabling the MSU mission and strategic plan through technology innovation. He provides oversight, management, and strategic planning for the university's information technology infrastructure.

He has 25+ years experience of innovative thinking and leadership across four large-scale research universities. Latimer was welcomed into the MSU family in June 2012 after having served as the Chief Technology Officer at the University of Notre Dame since 2002. He has also served as Executive Director for Statewide Infrastructure for the University of Tennessee, Director of Academic Computing at Kent State University, and Director of Computing and Technical Services at Clemson University. Latimer also helped establish the St. Joseph’s Valley Metronet (www.metronetzing.org), a 100 route-mile high-density privately owned and run metropolitan fiber network serving the South Bend (Indiana) and surrounding business community and served on it’s advisory board while at Notre Dame.

Stuart Leidner has been with Prospera Business Network since December of 2009. He has more than 20 years experience in for-profit and nonprofit development. His background includes research and economic impact analysis for the tourism industry of Idaho, coordinating research an innovation for the statewide Small Business Development Center network in the State of Washington, commercial lending, and grassroots private property conservation initiatives.

He is responsible for assuring the delivery of quality services through all of Prospera’s business consulting programs, including the Montana Women’s Business Center (WBC), and the Accelerated Entrepreneur Program.

As Executive Director, Stuart oversees four revolving loan fund programs which include three Community Development Block Grant (CDBG) funds and a USDA Intermediary Relending Program (IRP) loan fund and all of Prospera’s economic research projects and publications, economic impact analysis research and serves as the organization’s contact person for economic information.
Peter Martinson is a veteran of the Gallatin Valley technology environment. He co-founded several technology businesses after his graduation from Montana State University with a Masters Degree in Computer Science. As an active member of the Gallatin Valley Technology Alliance he helped foster a healthy high tech business sector. Peter has written commercially successful software, designed and supported high availability computing environments and managed complex technical projects. He is currently the IT Director for Gallatin County.

Scott McMahan has been the Information Technology Manager for the City of Bozeman since Nov 1st of 2012. Scott manages the IT staff members, manages IT related projects, and is involved with developing long term strategic technology initiatives. Scott is from Montana originally but has been in Bend, Oregon for the last 17 years. While in Bend Scott was a partner in AccTech Solutions, Inc. a consulting business that focused on local government and small to medium businesses where he managed the IT side of this business.

Bill Procunier is President and founder of Granite Enterprises, Inc. (2000), dba GraniteTCS, Inc. GraniteTCS specializes in providing professional technical consulting and support services in the areas of Information Technology, voice systems and low-voltage cabling and fiber optics. Granite supports 750+ small and medium size businesses located primarily in Gallatin and Park counties. Formerly, Bill was Vice President of the Systems Division for VLC/Powerhouse Technologies (purchased by Anchor Gaming/IGT). In this position, Bill was responsible for lottery and gaming machine control system product development, delivery and support in the United States and internationally. He holds Bachelor of Science degrees in Computer Science (U of M) and Business Management (MSU) and has 25+ years of product development and Information Technology support experience.

Warren Vaughan has worked for the Gallatin County Planning and Community Development Department since 2004. Warren has spent the past nine years working with communities around the Gallatin Valley on planning, growth, and community and economic development issues. Warren is also the director of the Bozeman Business Expansion and Retention (BEAR) program, an initiative aimed at connecting small business owners with private sector mentors. Warren is also currently pursuing his doctorate in Organization Development and is married with two daughters.

Lew Wilks is a proven business manager, with over 20 years of upper management and ownership experience. He currently serves as a management consultant and advisor for many companies, as well as owning several small businesses in the agriculture and hospitality industries. Prior to becoming a management consultant, Mr. Wilks served as the Chief Strategy Officer, President of Internet Markets, Business Markets, Business Development, and subsidiary operations for QWEST Communications. Under his leadership, the company developed worldwide operations from startup to over 20,000 employees in a three-year period.

From 1993-1997 Mr. Wilks held several positions at GTE Corporation (currently Verizon). He served as President of GTE Communications Corporation, where he led the US operations holding company for all deregulated products and services. Mr. Wilks also served as the GTE Northwest General Manager Branch Operations, GTE West (California, Northwest and Hawaiian Tel) VP/GM Business Markets, and President of US Business Markets. Prior to joining GTE,
Mr. Wilks served as Director at MCI Corporation, where he was responsible for all National Accounts and State and Federal Markets for a 14 state region. Mr. Wilks also held several management positions with Wang Laboratories from 1983-1989. He began his career at Datapoint Corporation, where he served as a Systems Engineer supporting advanced communications products.

Mr. Wilks has held board seats with PMC Sierra and Portal Software, both public companies. In addition, he has served as the Chairman of the State of Colorado Science and Technology Commission and as Chairman of Special Olympics in Colorado. He currently holds a board seat with Western Sustainability Exchange and is a member of the Planning and Zoning Board for Park County in Montana.

Mr. Wilks graduated from Central Missouri State University where he earned a Bachelor of Science Degree, Public Relations, with a cognate minor in Computer Science.

Molly Yarnell is Vice President of Information Technology at Zoot Enterprises. Zoot is a global provider of advanced loan origination, account acquisition and credit risk management solutions. Zoot services financial institutions world wide, including leading banks, automotive manufacturers, retailers and payment providers. Molly manages all aspects of the Zoot IT systems to ensure a high availability model. She is excited to participate in the Boradband Committee and to bring fault tolerant and redundant connectivity to Southwest Montana.

Molly has over 15 years experience in building and managing IT systems. She holds a BA in Communication from Montana State University and numerous IT Certifications.
What is most important, right now?  2013 – 2014 Priorities

1. Diversify the local economy and support the creation and expansion of mid to high paying jobs. (Fontenot/Kukulski) (ED-01)

2. Implement the 2012 parks & trails bond to expand the capacity of our parks, trails and open spaces. (Overton/Rosenberry/Sullivan) (PR-02) (Mayor: 1)

3. Implement reform of the community development system with an enhanced focus on customer service. (Worthington/Woolard) (CM-01)

4. Enhance Downtown Development Opportunities
   - Collaborate with the Downtown Partnership, Montana Department of Transportation and Transportation Coordinating Committee to improve transportation downtown.
   - Facilitate development of a downtown hotel as identified in the downtown development plan.


6. Implement financial plans and asset management systems to properly maintain and replace the city’s infrastructure and facilities (Rosenberry/Woolard) (PW-02)

7. Complete design of the police station & municipal court and educate the public on the necessity for, and passage of, a bond measure (Winn/Price) (PD-01)

8. Assist Gallatin College and secure regional funding. (City Commission)

9. Continue implementation of the Climate Action Plans (City Commission/Winn) (CM-04)

10. Determine the future of Bogert Pool and next steps for aquatics & Recreation (Overton/Kukulski) (PR-01)

11. Consider a Demolition by Neglect ordinance

12. Develop a permanent plan for the Story Mansion
VII. BOZEMAN ECONOMIC DEVELOPMENT GOALS AND STRATEGIES

The following list of economic development priorities – identified as goals and strategies – are a culmination of the research and development of the City of Bozeman Economic Development Plan. It is recognized that the City of Bozeman will lead the implementation of some of these goals and strategies, and with others, the City will assume a supporting role, while private entities lead the implementation. An Implementation Matrix, which identifies specific strategies for the City of Bozeman to initiate and lead with a corresponding timeline, is included in the next section (Section VIII). The goals and strategies are all important and there is no priority ranking attached to the order of presentation.

These goals and the more specific strategies provide a framework in which the City, the business community, and key stakeholder groups can plan, prioritize, and implement economic development activities for the benefit of all citizens of Bozeman. Not all of these proposed strategies will have the same impact, but through a focused and collaborative effort, Bozeman will be better positioned to be more competitive.

The specific recommendations and priorities of the City of Bozeman Economic Development Plan fall under the following 6 general economic development goals:

1. Support the expansion and retention of existing businesses and economic clusters that will continue to strengthen and diversify the economy and create higher paying jobs in Bozeman.

2. Maintain and upgrade infrastructure to support current and future needs of business.

3. Support education and workforce development initiatives to provide Bozeman with the qualified workers to meet the needs of business.

4. Leverage local, state and federal economic development resources to enhance economic growth in Bozeman.

5. Create a more collaborative and effective working partnership between the business community and the City of Bozeman and effectively manage the City of Bozeman's regulatory environment to accomplish goals without hindering business expansion and economic growth.

6. Maintain the high quality of life that is considered an important asset to the business community.
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1) Support the expansion and retention of existing businesses and economic clusters that will continue to strengthen and diversify the economy and create higher paying jobs in Bozeman.

   a. Pursue, support, and provide assistance for business start-up, expansion, and business recruitment efforts that strengthen the following economic clusters:

      - Arts & Culture (artisans, fine arts, cultural heritage, entertainment)
      - Construction and Development (architecture, construction, engineering)
      - Green (clean and renewable energy, water conservation, waste reduction technologies, outdoor/recreational activities)
      - Healthcare and Medicine
      - Knowledge Based Enterprises (research and development, think tanks, financial services, consulting, public policy, education)
      - Manufacturing (machinery, printing, wood product, textile, food/beverage, computer/electronic)
      - Media (film, publishing, journalism, Internet)
      - Technology (biotech/bioscience, information technology, laser/optics)

   b. Support and promote entrepreneurial efforts linked to emerging markets, high technology, and research and development.

   c. Support the Business Expansion and Retention (BEAR) program that is facilitated by the Bozeman Area Chamber of Commerce and Bozeman Job Service.

   d. Leverage MSU-Bozeman research, faculty, and students to expand upon current opportunities and identify additional opportunities for the long term economic diversity and vitality of Bozeman.

   e. Encourage the participation of the business community in the development of city-wide programs related to transportation, growth management, development impact fees, environmental protection, and other related issues.

   f. Support efforts by the Bozeman Convention and Visitors Bureau, the Bozeman Area Chamber of Commerce, the Downtown Bozeman Partnership, Prospera Business Network, MSU-Bozeman, and others to promote Bozeman.
2) Maintain and upgrade infrastructure to support the current and future needs of business.

   a. Maintain infrastructure (city service or private service) at safe and efficient levels to satisfy the current and future needs for economic expansion. The condition of streets and sidewalks, water and sewer, gas and electric distribution, communications, and solid waste disposal all affect how efficiently businesses conduct their operations. It also contributes to business retention and recruitment efforts.

   b. Support and encourage the efforts to develop larger convention or conference center facilities to attract larger statewide or regional meeting and convention business to Bozeman.

   c. Support or lead efforts to develop an industrial park to meet the needs of existing and future manufacturing or industrial businesses.

   d. Support the efforts of the Gallatin Airport Authority and others to maintain and expand air service at Gallatin Field Airport in recognition of the importance of Gallatin Field Airport to Bozeman’s economy.

   e. Support the further development of technology park areas to meet the needs of existing and future technology based companies.

3) Support education and workforce development initiatives to provide Bozeman with the qualified workers to meet the needs of business.

   a. Support the efforts of the Montana University System to expand 2-year degree and job training and certification programs in Bozeman.

   b. Support the enrollment growth of MSU-Bozeman through the statewide legislative level and at the local level. All avenues should be explored that promote MSU and Bozeman in a cooperative manner.

   c. Support the creation of market-rate and affordable rental and owner-occupied housing that meets the needs of the local workforce.

   d. Encourage MSU College of Technology in Bozeman, Bozeman Job Service and the Bozeman School District to develop and maintain continuing education and certification programs for high-demand jobs.

   e. Support a periodic comprehensive survey among local employers and target sectors to identify their labor needs and minimum skill requirements. Utilize findings of the survey
to coordinate with MSU, MSU College of Technology, Bozeman School District, and others to refine existing and develop new programs directed at addressing the identified skill needs.

f. Work with existing or new businesses to access Montana Department of Commerce Workforce Training Grants to support employee training costs.

g. Continue to support the Bozeman Area Chamber of Commerce’s Leadership Bozeman Program to identify, train, and motivate prospective and current business and community leaders.

h. Support the “Come Home Montana” promotion (and consider developing a “Come Home Bozeman” promotion) to Montana alumni residing out of state, highlighting local employers and career opportunities, local quality of life, and other factors that may lead to a decision to return to Bozeman.

4) **Leverage local, state, and federal economic development resources to enhance economic growth in Bozeman.**

a. Continue to utilize tax increment financing (TIF) programs as a tool for urban renewal and economic redevelopment opportunities where appropriate.

b. Support the continued growth and success of the Bozeman Revolving Loan Fund (RLF) and the establishment of new revolving loan funds to provide additional financing options for Bozeman businesses.

c. **Utilize incentives or inducements, such as property tax abatement or development fee abatement, to encourage business investment and development in desired areas.**

d. Encourage commercial real estate developers to apply for New Market Tax Credits on projects that meet the established criteria.

e. Utilize the Big Sky Economic Development Trust Fund (job training grants, planning grants, matching funds) and Workforce Training Grants from the Montana Department of Commerce to support business expansion and relocation as well as current economic development planning projects.

f. Seek new Community Development Block Grant (CDBG) funds to implement projects and programs.
g. Utilize Brownfield funding to facilitate redevelopment in appropriate sites where funding is available.

h. Identify and support redevelopment opportunities and adaptive reuse of large commercial centers.

5) Create a more collaborative and effective working partnership between the business community and the City of Bozeman and effectively manage the City of Bozeman's regulatory environment to accomplish goals without hindering business expansion and economic growth.

a. Establish an advisory committee to perform a time-limited review of the City of Bozeman's development process. The committee would be charged with evaluating development issues and making recommendations for policy or procedure changes to the City Commission. The committee would be made up of business leaders, city planning staff, developers, planning board members, and others. The following 4 strategies would best be evaluated and implemented by this development process review committee:

(1) Review the processes for permitting, licensing, and other regulatory requirements to improve the climate for doing business in Bozeman.

(2) Provide an efficient and well-defined land development process with development regulations being as flexible as possible and efficiently administered.

(3) Support continuing technological advances in systems and equipment to make the development permitting process more efficient. Integrate technology into business processes to increase operational efficiencies, improve service delivery and control costs.

(4) Empower the Planning Department staff and the City Commission to build more efficiency in the decision making process.

b. Designate a qualified city employee with economic development responsibilities and a role as the community business advocate.

c. Establish an Economic Development Council to advise the City Commission on economic development issues and to review the implementation of specific economic development initiatives. This council should be made up of business leaders, city staff, economic development leaders, and others.
d. Engage in an active program for the City Commission and City staff to visit Bozeman businesses on a routine basis, with the intent of improving the relationship between the City and the business community, and to proactively identify issues and work to resolve them collaboratively. Coordinate with the Bozeman Area Chamber of Commerce, Prospera Business Network, and others to facilitate this program.

e. Ensure working economic development relationships with Gallatin County and other jurisdictions within the region to better coordinate economic development activities.

f. Coordinate with the Bozeman Area Chamber of Commerce, Prospera Business Network, the Northern Rocky Mountain Resource and Conservation District and Economic Development District (RC&D-EDD), the Downtown Bozeman Partnership, the Montana Department of Commerce, and others to monitor local, regional and national economic trends and market Bozeman as a desirable place to do business.

g. Support efforts of the Montana Manufacturing Extension Center (MMEC), TechRanch, the Small Business Development Center (SBDC), and other organizations to encourage and foster entrepreneurship and small business development in Bozeman.

6) Maintain the high quality of life that is considered an important asset to the business community.

a. Recognize and support the idea that Bozeman’s “quality of place” is a significant asset for the business community.

b. Support the continued economic vitality of the downtown Bozeman business district, which is broadly recognized as one of Bozeman’s strongest assets. Continue to support and promote downtown Bozeman as the economic and cultural center of the region, and encourage development and re-development through the use of incentives for future investment and development. [Refer to the 2009 Downtown Improvement Plan for additional information.]

c. Support the economic vitality of Bozeman’s entryway corridors to reinforce Bozeman as a regional shopping destination.

d. Require a cost benefit analysis or economic impact analysis for all projects receiving financial assistance from the City (including incentives) to measure the return on investment.

e. Promote an energy efficient and sustainable community through the City’s policies and practices. [Refer to Bozeman Community Plan for additional information]
COMMISSION RESOLUTION NO. 4434

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF BOZEMAN, MONTANA, EXPRESSING SUPPORT FOR THE BROADBAND STEERING COMMITTEE AND THEIR EFFORTS TO BRING FAST, RELIABLE AND AFFORDABLE BROADBAND INTERNET SERVICES TO THE REGION IN FURTHERANCE OF THE CITY'S ECONOMIC DEVELOPMENT GOALS.

WHEREAS, the City of Bozeman and its citizens support efforts to strengthen the economic vitality of Bozeman and the surrounding area; and

WHEREAS, the Bozeman City Commission identified economic development as a high priority; and

WHEREAS, the City of Bozeman’s 2009 Economic Development Plan’s first goal is to support the expansion and retention of existing businesses and economic sectors that will continue to strengthen and diversify the economy and create higher paying jobs in Bozeman and the surrounding area; and

WHEREAS, the City of Bozeman’s 2009 Economic Development Plan’s second goal is to maintain and upgrade infrastructure to support current and future needs of business; and

WHEREAS, the City of Bozeman’s Economic Development Council has discussed the importance of broadband internet service to accomplishing the aforementioned goals; and

WHEREAS, the Broadband Steering Committee has determined that a lack of affordable, reliable and fast broadband internet service in the region could be a limiting factor in the economic growth of technology and other sectors.
NOW, THEREFORE, BE IT RESOLVED by the City Commission of the City of Bozeman, Montana, that the City Commission supports efforts by the Broadband Steering Committee to bring fast, reliable and affordable broadband internet service to Bozeman and the region in furtherance of the City’s economic development goals.

PASSED AND APPROVED by the City Commission of the City of Bozeman, Montana, at a regular session thereof held on the 6th day of May, 2013.

SEAN A. BECKER
Mayor

STACY ULMEN, CMC
City Clerk

APPROVED AS TO FORM:

GREG SULLIVAN
City Attorney
MINUTES OF THE MEETING OF THE CITY COMMISSION
BOZEMAN, MONTANA

May 6, 2013

The Commission met in the City Commission Room, City Hall at 121 North Rouse on Monday, May 6, 2013. Present were Mayor Sean Becker, Deputy Mayor Krauss, Commissioner Cyndy Andrus, Commissioner Carson Taylor, Commissioner Chris Mehl, City Manager Chris Kukulski, City Attorney Greg Sullivan, and City Clerk Stacy Ulmen.

*These minutes are not word for word and should be considered along with the audio recording.

0:00:38 A. Call to Order – 6 p.m. – Commission Room, City Hall, 121 North Rouse
Mayor Becker called the regular meeting to order at 6 p.m.

0:00:41 B. Pledge of Allegiance and a Moment of Silence

0:01:40 C. Changes to the Agenda
City Manager Chris Kukulski reported that there may be a change to the agenda to remove Consent Item 7. Approve Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City's Economic Development Goals and move it to the first Action Item of the evening. The Commission agreed. City Clerk Stacy Ulmen reported that a Public Service Announcement has been added for Bike to Work Week.

0:02:38 Public Service Announcement-Bike to Work Week
John VanDelinder, Staff Liaison to the Bike Board gave a PSA regarding Bike to Work week.

0:03:51 D. Consent
1. Authorize Payment of Accounts Payable Claims (LaMeres)
2. Authorize Mayor to sign a Preliminary Plat Findings of Fact and Order for the Knoll at Baxter West Subdivision, Application P-12014 (Skelton)
3. Authorize Mayor to sign a Preliminary Plat Findings of Fact and Order for The Crossing at Baxter Meadows, Phase 4B-41, Application P-12017 (Skelton)
4. Authorize City Manager to sign a Contract Extension with Nishkian Monks, PPLC for the second phase of the Structural Assessment, Condition Report, and Construction Estimates for Fire Station One at 34 North Rouse Avenue (Goehrung)

5. Accept the Building Division Report for the quarter ending March 31, 2013 (Risk)

6. Ratify City Manager’s signature accepting Grant funding in the amount of $10,000 from the Montana Board of Crime Control (McLane)

7. Approve Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City’s Economic Development Goals (Fontenot) *Removed

8. Approve Resolution No. 4436, Declaring the Intent to create Special Improvement Lighting District 715, Norton East Ranch, Phase 2 (Clark)

9. Approve Resolution No. 4437, Amending the Fiscal Year 2013 Fire Capital & Equipment Replacement Budget for Purchase of a 100 foot Mid-mount Aerial Platform Truck (Shrauger)

10. Approve Resolution No. 4438, Establishing a Public Right-of-Way in Block E of Rouse’s 2nd Addition, Reestablishing a Public Right-of-Way in the southern portion of the Alley of Block E, and Authorizing the Aggregation of Lots 21 – 30 of Block E (Sullivan)

11. Authorize City Manager to sign a Purchase Agreement with Sutphen Corporation in the amount of $1,100,389.86 for a 100 foot Mid-mount Aerial Platform Truck (Shrauger)

12. Provisionally Adopt Ordinance No. 1865, adopting a Zone Map Amendment to R-4 Zoning (Residential, High Density) for Tract C of the Amended Plat of the Van Horn Subdivision on Fowler Road, Application Z-12219, First Baptist Church (Skelton)

13. Finally Adopt Ordinance No. 1848, establishing a Zoning Designation of R-1 (Residential, Single-Household Low Density) on 1.92 acres for Lot 9, Block 1, Walker Property Subdivision, Application Z-12091 (Skelton)

0:03:58 Public Comment
Mayor Becker opened public comment on the Consent Agenda.
No person commented.
Mayor Becker closed public comment.

0:04:10 **Motion and Vote** to approve Consent Items D. 1-6 and 8-13 as submitted.

**It was moved by Deputy Mayor Krauss, seconded by Cr. Taylor to approve Consent Items D. 1-6 and 8-13 as submitted.**

Those voting **Aye** being Deputy Mayor Krauss, Crs. Taylor, Mehl, Andrus and Mayor Becker.
Those voting **No** being none.
The motion passed 5-0.

0:04:30 E. **Public Comment**
Mayor Becker opened general public comment.
0:04:54 **Jerry Pape, Public Comment**
Mr. Pape spoke regarding business opportunities and the importance of accountability.

0:08:31 Public Comment closed
Mayor Becker closed public comment.

0:08:38 F. **Action Items**

0:08:39 Consent Item No. 7 Approve Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City's Economic Development Goals (Fontenot)

0:08:50 Brit Fontenot, Economic Director
Mr. Fontenot gave the staff presentation regarding Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City's Economic Development Goals.

0:10:45 Commission discussion
The Commission discussed Dr. Dewitt Latimer, Montana State University's Chief Information Officer and chair of the Committee's recent death and offered their condolences. They also discussed Mr. Fontenot's position with the Committee, the goal of the Committee and what is being looked at currently in terms of connectivity and providers.

0:14:52 **Motion and Vote** to Approve Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City's Economic Development Goals.

*It was moved by Cr. Taylor, seconded by Cr. Mehl to Approve Resolution No. 4434, supporting the Broadband Steering Committee in their efforts to bring fast, reliable and affordable Broadband Internet Services to the region in furtherance of the City's Economic Development Goals.*

Those voting Aye being Crs. Taylor, Mehl, Andrus, Deputy Mayor Krauss and Mayor Becker.
Those voting No being none.
The motion passed 5-0.
0:15:13 1. Conditional Use Permit and Certificate of Appropriateness with Deviations and Variance Application Z-13052 for a Town Pump at 803 East Main Street (Quasi-Judicial) (Krueger)

0:15:51 Brian Krueger, Development Review Manager
Mr. Krueger gave the staff presentation regarding Conditional Use Permit and Certificate of Appropriateness with Deviations and Variance Application Z-13052 for a Town Pump at 803 East Main Street.

0:35:09 Commission Questions for staff
The Commission and Staff discussed the Urban Core, the design objectives, the granting of deviations, fuel truck access, the approach onto East Main, flood plain review, egress and the design and signalization in the area and the turn movements.

0:53:32 Applicant Presentation
The Applicant representative gave that staff presentation for the Conditional Use Permit and Certificate of Appropriateness with Deviations and Variance Application Z-13052 for a Town Pump at 803 East Main Street. They spoke regarding access and the fuel tank location.

1:03:59 Commission questions for Applicant
The Commission and Applicant discussed the southern area curb and the fuel area, safety on the site and the fuel tank location.

1:22:32 Public Comment
Mayor Becker opened public comment.

1:22:40 Mike Delaney, Public Comment
Mr. Delaney stated that he owns properties adjacent to this project. He agrees the right hand turn lane and concurs with its safety.

1:26:11 Public Comment closed
Mayor Becker closed public comment.

1:26:33 Commission Questions for Staff
The Commission and staff discussed mountable curbs and the value of the project.

1:30:34 Motion that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve with conditions the variance to Section
38.10.050.A.2 BMC to encroach 13 feet into the required minimum 25 foot front yard for parking and loading areas with conditions.

It was moved by Cr. Mehl, seconded by Cr. Andrus that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve with conditions the variance to Section 38.10.050.A.2 BMC to encroach 13 feet into the required minimum 25 foot front yard for parking and loading areas with conditions.

1:31:11 Commission Discussion on the Motion

1:32:50 Vote on the Motion that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve with conditions the variance to Section 38.10.050.A.2 BMC to encroach 13 feet into the required minimum 25 foot front yard for parking and loading areas with conditions.

Those voting Aye being Crs. Mehl, Andrus, Deputy Mayor Krauss, Cr. Taylor and Mayor Becker.
Those voting No being none.
The motion passed 5-0.

1:33:17 Motion that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve the conditional use permit and certificate of appropriateness with deviations, and variance application with conditions and subject to all applicable code provisions as amended.

It was moved by Cr. Mehl, seconded by Cr. Andrus that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve the conditional use permit and certificate of appropriateness with deviations, and variance application with conditions and subject to all applicable code provisions as amended.

1:33:41 Commission discussion on the Motion
The Commission discussed the fuel tanks, hazards with ingress and egress, concerns of the closeness to the intersection, attracting people to downtown, the design of the station, increased access to library and improvements to what is in the area currently.

1:46:34 Amendment to the Main Motion and Vote to strike Conditions 4 and 12.
It was moved by Cr. Mehl seconded by Deputy Mayor Krauss to strike Conditions 4 and 12.

Those voting Aye being Cr. Mehl, Deputy Mayor Krauss, Crs. Taylor, Andrus and Mayor Becker.
Those voting No being none.
The motion passed 5-0.

1:47:15 Amendment to the Main Motion to add a condition that southern access approach onto on North Broadway shall be designed with a mountable curb.

It was moved by Cr. Taylor to add a condition that southern access approach onto on North Broadway shall be designed with a mountable curb.

Motion failed due to the lack of a second.

1:47:52 Vote on the Main Motion as Amended that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13052 and move to approve with conditions the variance to Section 38.10.050.A.2 BMC to encroach 13 feet into the required minimum 25 foot front yard for parking and loading areas with conditions.

Those voting Aye being Crs. Mehl, Andrus, Deputy Mayor Krauss, Cr. Taylor and Mayor Becker.
Those voting No being none.
The motion passed 5-0.

1:48:16 Break
Mayor Becker declared a break.

2:03:33 Meeting called back to order
Mayor Becker called the meeting back to order.

2:03:42 2. Distillery and Tasting Room Conditional Use Permit and Certificate of Appropriateness, 121 West Main Street, Application Z-13053 (Quasi-Judicial) (Krueger)

2:04:08 Brian Krueger, Development Review Manager
Mr. Krueger gave the Staff presentation for the Distillery and Tasting Room Conditional Use Permit and Certificate of Appropriateness, 121 West Main Street, Application Z-13053.
2:12:43 Commission Questions for staff
The Commission and staff discussed state licensing and alcohol being produced on-site, building codes, sprinkling, a fire wall and accessory uses and commercial production, laws that apply to tasting rooms and enforcement.

2:32:14 Applicant Presentation
Applicant Representative Steve Locatti gave the applicant presentation regarding the Distillery and Tasting Room Conditional Use Permit and Certificate of Appropriateness, 121 West Main Street, Application Z-13053.

2:36:16 Commission questions for Applicant
The Commission and Applicant discussed state laws and what can be served, the definition of produce and produced, and examples of other distilleries that bring in outside product and blend.

2:46:33 Public Comment
Mayor Becker opened public comment.

2:46:43 Art Wittich, Public Comment
Mr. Wittich spoke regarding uses under State Law. He asked the Commission to deny the application because of the difference between a bar and a tasting room.

2:53:21 Public Comment closed
Mayor Becker closed public comment.

2:53:54 Applicant rebuttal
The Applicant spoke regarding the blended process, investigations in other distilleries in Montana along with the site plan and floor plan.

2:55:35 Greg Sullivan, City Attorney
Mr. Sullivan provided legal advice on approving or disapproving the application.

2:57:01 Motion that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13053 and move to approve the Conditional Use Permit with conditions and subject to all applicable code provisions.

It was moved by Cr. Andrus, seconded by Deputy Mayor Krauss that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13053 and move to approve the Conditional Use Permit with conditions and subject to all applicable code provisions.
2:57:28 Commission discussion on the Motion
The Commission spoke regarding downtown, granting rules, on premise consumption, concern of the closing time, enforcement and what is permissible in B-3 zoning.

3:10:00 **Vote on the Motion** that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13053 and move to approve the Conditional Use Permit with conditions and subject to all applicable code provisions.

Those voting **Aye** being Cr. Andrus, Deputy Mayor Krauss, Crs. Taylor, Mehl and Mayor Becker.
Those voting **No** being none.
The motion passed 5-0.

3:11:06 3. **Conditional Use Permit and Certificate of Appropriateness to allow automotive fuel sales at Smith's Food and Drug, 1735 West Oak Street, Application Z-13057 (Quasi-Judicial) (Saunders)**

3:11:56 Chris Saunders, Assistant Planning Director
Mr. Saunders gave the staff presentation regarding a Conditional Use Permit and Certificate of Appropriateness to allow automotive fuel sales at Smith's Food and Drug, 1735 West Oak Street, Application Z-13057.

3:17:00 Commission questions for Staff
The Commission and Staff discussed the review of the final site plan and the lighting in the area.

3:19:24 Applicant Presentation
The Applicant Representative gave the applicant presentation for the Conditional Use Permit and Certificate of Appropriateness to allow automotive fuel sales at Smith's Food and Drug, 1735 West Oak Street, Application Z-13057.

3:20:52 Public Comment
Mayor Becker opened public comment.
No person commented.
Mayor Becker closed public comment.

3:20:59 **Motion** that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13057 and move to approve the conditional use permit and certificate of appropriateness with conditions and code provisions as outlined in the staff report.
It was moved by Deputy Mayor Krauss, Seconded by Cr. Taylor that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13057 and move to approve the conditional use permit and certificate of appropriateness with conditions and code provisions as outlined in the staff report.

3:21:27 Commission discussion on the Motion

3:21:35 Vote on the Motion that having reviewed the application, considered public comment, and all information presented, I hereby adopt the findings presented in the staff report for application Z-13057 and move to approve the conditional use permit and certificate of appropriateness with conditions and code provisions as outlined in the staff report.

Those voting Aye being Deputy Mayor Krauss, Crs. Taylor, Mehl, Andrus and Mayor Becker.
Those voting No being none.
The motion passed 5-0.

3:21:48 4. Consideration to vacate a Conditional Use Permit for an accessory dwelling unit, at 1111 South Willson Avenue and allow reconstruction of a lawful non-conforming two dwelling structure, Application Z-12192A (Quasi-Judicial) (Saunders)

3:22:14 Cr. Mehl disclosure
Cr. Mehl disclosed that this property is located north of his property.

3:22:53 Chris Saunders, Assistant Planning Director
Mr. Saunders gave the staff presentation regarding the Consideration to vacate a Conditional Use Permit for an accessory dwelling unit, at 1111 South Willson Avenue and allow reconstruction of a lawful non-conforming two dwelling structure, Application Z-12192A.

3:27:43 Greg Sullivan, City Attorney
Mr. Sullivan spoke regarding uses and timing.

3:32:07 Commission Questions for Staff
The Commission and Staff discussed the Polk registry.
3:36:48 Applicant Presentation
The Applicant representative gave the application presentation for the Consideration to vacate a Conditional Use Permit for an accessory dwelling unit, at 1111 South Willson Avenue and allow reconstruction of a lawful non-conforming two dwelling structure, Application Z-12192A.

3:39:46 Public Comment
Mayor Becker opened public comment.

3:39:57 **Don Murdock, Public Comment**
Mr. Murdock spoke regarding Montana State University living arrangements.

3:42:27 Public Comment closed
Mayor Becker closed public comment.

3:42:35 Applicant Response
The Applicant spoke regarding the density of the project.

3:43:28 Mr. Sullivan
Mr. Sullivan gave legal advice regarding the Commission's possible action on this item.

3:44:22 Commission Questions for applicant and Staff
The Commission, applicant and staff discussed the construction schedule, the zoning and history of the property, the fire that caused damage at the property.

3:54:02 **Motion** that having reviewed the submitted materials, considered public comment, and considered all of the information presented, move to amend Conditional Use Permit Z-12192 to (i) recognize the legal non-conforming status of the two household structure and related uses as existed at the time the structure was destroyed by fire in August, 2011; (ii) authorize the reconstruction of the two household structure and reestablishment of the two household use in substantially the same manner and extent as existed prior to the August, 2011 fire; and (iii) retain the previous approval of the associated certificate of appropriateness. All conditions of approval related to the Accessory Dwelling Unit as adopted September 10, 2012 shall be vacated. It was moved by Cr. Taylor, seconded by Cr. Mehl that Having reviewed the submitted materials, considered public comment, and considered all of the information presented, move to amend Conditional Use Permit Z-12192 to (i) recognize the legal non-conforming status of the two household structure and related uses as existed at the time the structure was destroyed by fire in August, 2011; (ii) authorize the reconstruction of the two household structure and reestablishment of the two household use in substantially the same manner and extent as existed prior to the August, 2011 fire; and (iii) retain the previous approval of the associated certificate of
appropriateness. All conditions of approval related to the Accessory Dwelling Unit as adopted September 10, 2012 shall be vacated.

3:55:07 Commission discussion on the Motion

3:57:20 **Vote on the Motion** that having reviewed the submitted materials, considered public comment, and considered all of the information presented, move to amend Conditional Use Permit Z-12192 to (i) recognize the legal non-conforming status of the two household structure and related uses as existed at the time the structure was destroyed by fire in August, 2011; (ii) authorize the reconstruction of the two household structure and reestablishment of the two household use in substantially the same manner and extent as existed prior to the August, 2011 fire; and (iii) retain the previous approval of the associated certificate of appropriateness. All conditions of approval related to the Accessory Dwelling Unit as adopted September 10, 2012 shall be vacated.

**Those voting Aye** being Crs. Taylor, Mehl, Andrus Deputy Mayor Krauss.
**Those voting No** being none.
**The motion passed 5-0.**

3:57:36 5. **Appointments to the Building Division Board of Appeals (Brunckhorst)**

3:57:43 **Motion and Vote** to reappoint Michael Kelly and David Wright to the Building Division Board of Appeals.

**It was moved by Cr. Mehl, seconded by Cr. Andrus to reappoint Michael Kelly and David Wright to the Building Division Board of Appeals.**

**Those voting Aye** being Crs. Mehl, Andrus, Deputy Mayor Krauss, Cr. Taylor and Mayor Becker.
**Those voting No** being none.
**The motion passed 5-0.**

3:58:09 6. **Appointment to the Planning Board (Brunckhorst)**

3:59:18 **Motion and Vote** to confirm the Mayoral Appointment of Julien Morice to the Planning Board.

**It was moved by Cr. Mehl, seconded by Deputy Mayor Krauss to confirm the Mayoral Appointment of Julien Morice to the Planning Board.**
Those voting Aye being Cr. Mehl, Deputy Mayor Krauss, Crs. Taylor, Andrus and Mayor Becker.
Those voting no being none.
The motion passed 5-0.

3:59:31 G. FYI/Discussion
1. Parks and Trails Bond
2. Packets
3. Pictures

4:01:46 H. Adjournment
Mayor Becker adjourned the meeting at 10:02 p.m.

ATTEST:
Stacy Ulmen, CMC, City Clerk

PREPARED BY:
Stacy Ulmen, CMC, City Clerk

Approved on June 10, 2013
GALLATIN COUNTY COMMISSION RESOLUTION NO. 2013-_____

A RESOLUTION OF THE COMMISSION OF GALLATIN COUNTY, MONTANA, EXPRESSING SUPPORT FOR THE BROADBAND STEERING COMMITTEE AND THEIR EFFORTS TO BRING HIGH SPEED, RELIABLE AND AFFORDABLE BROADBAND INTERNET SERVICES TO THE REGION IN FURTHERANCE OF THE COUNTY'S ECONOMIC DEVELOPMENT GOALS.

THIS RESOLUTION was introduced by____________________, moved by Commissioner _____________________________, and seconded by Commissioner ___________________________. This resolution was passed unanimously and adopted.

WHEREAS, this Resolution was introduced by Earl Mathers, County Executive and its citizens support efforts to strengthen the economic vitality of Gallatin County and the surrounding area; and

WHEREAS, the 2012 Comprehensive Economic Development Strategy is to support the expansion and retention of existing businesses and economic sectors that will continue to strengthen and diversify the economy and create higher paying jobs in Gallatin County and the surrounding area; and

WHEREAS, the Gallatin County Commission has discussed the importance of broadband internet service to accomplishing the aforementioned goals; and

WHEREAS, the Broadband Steering Committee has determined that the lack of affordable, reliable and high-speed broadband internet service in the region could be a limiting factor in the economic growth of high-tech and other sectors.

NOW, THEREFORE, BE IT RESOLVED:

1. The Commission of Gallatin County, Montana, that the County supports efforts by the Broadband Steering Committee to bring high-speed, reliable and affordable broadband internet service to Gallatin County and the surrounding area and will assist in those efforts when appropriate.
2. Furthermore, the County Commission hereby directs that County engineering, permitting, grants and related staff provide recommendations regarding the cost/benefit of installing conduit to support fiber optic service in conjunction with utility, road repair or other like situations.

Dated: November 19, 2013

BOARD OF COUNTY COMMISSIONERS
GALLATIN COUNTY

By________________________
Joe P. Skinner, Chairman

ATTEST:

________________________
Charlotte Mills, Clerk & Recorder
Bozeman Fiber Initiative Project Overview

DECEMBER, 2014
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Executive Summary

In 2012, with the support of the Bozeman City Commission (Commission Resolution 4434) the City established the Broadband Steering Committee (BSC). The BSC is composed of technology sector professionals, economic developers, telecommunications industry professionals, financial services professionals and local government officials. Since July 2014, members of the BSC have been working with Design Nine, a nationally recognized broadband planning firm to, in the words of Commission Resolution 4434, “bring fast, reliable, and affordable broadband service to Bozeman and the region in furtherance of the City’s economic development goals.”

High-performance broadband is essential infrastructure for developing Bozeman’s economy. Technology firms, film makers, medical providers, banks, businesses, and startups require fast, reliable, and affordable connections to their clients. Educational institutions increasingly depend on broadband to provide high quality instruction and meet standards for integrating technology into the classroom to prepare students for careers. Through a public – private partnership, the Bozeman Broadband Initiative seeks to increase access to fiber and significantly lower the cost of broadband for business by stimulating competition for private sector service delivery through public and private infrastructure investment.

The project team, convened by the City of Bozeman, the Broadband Steering Committee, and the Economic Development Council, was tasked to explore the feasibility of developing a community-owned, high-performance broadband network for Bozeman. The overall goal of this effort is to:

- Identify the kind and type of broadband network needed to retain existing Bozeman businesses and to help attract new businesses and jobs.
- Identify the benefits of a high performance, redundant, affordable broadband network to community institutions like City government, healthcare, K12 schools, and higher education.
- Determine if such an effort is financially feasible and sustainable.
- Identify the steps needed to be taken to initiate and develop the project if a decision is made to move forward.

For local government to make an informed decision about moving forward with a broadband initiative, several questions have to be answered:

- Does the demand exist for improved high performance, affordable broadband?
- What are the design goals for the effort?
- If a new high performance fiber network is built, who will own and manage it?
- What is the business model for the venture (e.g. retail services, wholesale only)?
- Can the venture generate the necessary revenue to be financially sustainable?
- How will it be funded?
**Local Demand**

Bozeman has a critical mass of local government agencies, K12 schools, colleges, health care institutions, and large and small businesses that can provide the early customer base needed to generate the revenue that would provide the financial support for the network.

**Design Goals**

A Bozeman Fiber Initiative should have the following characteristics:

- **Standards-based** - Bozeman Fiber should be based on an active Ethernet architecture for the core network and for delivery of business class services to key anchor institutions and businesses. If, in the future, the network begins to deliver fiber to the home on a widespread basis, a PON (Passive Optical Network) architecture might also be deployed.

- **Scalable** - The initial development of the network should support a graceful expansion over time to be extended to all areas of the city with additional expansion to adjacent economic growth zones outside the city limits.

- **Business-class capable** - The network should be able to deliver any amount of bandwidth needed by any business connected to the network, with any desired quality of service (QoS) required to make Bozeman businesses competitive in the world economy.

- **Redundancy and Resiliency** – Bozeman businesses and anchor tenants need a high reliability network. The initial phases of the network should be designed with a redundant “ring” architecture to minimize downtime from accidental fiber cuts and network equipment failures.

- **Offer equal access to all providers** – The network should be operated on an open access, wholesale business model with all business and residential services provided by qualified private sector providers. A single public wholesale price list will be used to determine the cost of provider use of the network.

- **Equal access to all residents and businesses over time** – The goal of a Bozeman Fiber Initiative would be to deliver high performance fiber services to all residents and businesses as rapidly as possible consistent with fiscally conservative operations.

- **Offer a wide range of competitive providers and services** – Bozeman Fiber should be operated as a multi-provider, multi-service network with a wide range of competitive price and service options available to customers.

**Ownership and Governance**

Bozeman Fiber should be operated as a locally controlled, independent, private sector entity firmly vested with the long term interests of the community. This will provide the network with two important requirements:

- The enterprise will have the business and management flexibility needed to make decisions efficiently and effectively in the fast-moving broadband business environment.
As a private sector enterprise, the effort can be operated on behalf of the community and economic development needs of the community, but will not be limited by public sector restrictions on operations or decision-making.

**Business Model**
The network should be operated as a single high performance lit fiber (Layer 2) network available to any and all service providers, including incumbent providers who want access to the significant market opportunity represented by Bozeman. This shared business model is fundamentally different from the twentieth century copper-based networks where each provider has to build and operate a completely duplicated network (i.e. two providers each build a separate and duplicated network to reach the same customers, which results in higher costs across the board for customers).

**Funding Strategy**
The Bozeman Fiber Initiative should develop a “basket” of funding options, including long term service commitments from anchor tenants (e.g. the City, schools, major businesses), state and Federal grant opportunities (e.g. public safety grants), revenue from the network itself, charitable contributions, tax credits, and one time fees for costs associated with connecting a new customer to the network. The Bozeman Fiber Initiative should also leverage tax increment finance (TIF) districts for infrastructure construction and seek private sector financing and capital, if appropriate.
The Economic Impact of Broadband

Over the next thirty years, the businesses, residents, and institutions of Bozeman will spend over one billion dollars on telecommunications services—in today’s dollars, unadjusted for inflation and unadjusted for price increases. Some analysts believe that the average household bill for services delivered via broadband may double in the next ten years, which would make the thirty year projection easily reach $2 billion. Currently, there exists a substantial opportunity to capture more of these funds and direct them towards greater job creation and business opportunities for the community.

Numerous studies indicate that demand for bandwidth is doubling every two years, and that the FCC expects that the typical bandwidth needed by businesses and residents in 2015 will exceed 50 megabits. Indeed, the New Hampshire FastRoads community-owned fiber network is finding that their 50 meg residential Internet service is extremely popular...in rural and remote New Hampshire.

Community livelihood and the economic future in the Bozeman area is dependent upon the availability of affordable and redundant high speed broadband services—at the bandwidths that will be needed to conduct business in the future (“big” broadband), not at today’s “little” broadband speeds. Businesses large and small are already heavy users of the Internet, and their bandwidth needs will increase dramatically as two business trends accelerate:

Business travel costs are increasing rapidly as the cost of fossil fuel increases. Both the cost of ordinary commuting to the workplace is increasing as well as the cost of out of town business travel by air. Businesses are already investing heavily in HD quality business videoconferencing systems, and will make more use of them to reduce travel costs and to improve the sustainability of those businesses through lower costs.

These HD quality business videoconferencing systems require dramatic increases in bandwidth that are not affordable, or in most cases not even available, in certain areas of Bozeman. The market exists in Bozeman to implement the infrastructure to support resources like HD quality business videoconferencing systems considering the largest business sector in the area comes from professional business services. In many states and the federal government, the employment commission encourages businesses to allow employees to work from home to help with work-life balance and reduce overhead costs in the office, but the broadband infrastructure must be in place. High performance broadband could have positive effects: it could enable more people to work from home, it could enable more home-based businesses, and it could aid in retaining and attracting more businesses to the community.

More and more people are working from home, either on a part time or a full time basis. New work from home job opportunities are growing rapidly, but most of those jobs require a wired Internet and a wired phone connection to qualify. Many corporate and business employees will be seeking permission to work more from home (e.g. one or two days per week) to reduce travel costs. Some major businesses in other parts of the U.S. are already actively planning to have
20% of their workforce work full time from home to reduce employee travel costs and office energy costs. Telework initiatives are becoming more widespread throughout the country. Corporate employees working from home require high bandwidth services to be connected to the office network and to use corporate videoconferencing systems--one of the most common complaints we hear is that corporate VPNs (Virtual Private Networks) do not work with a worker’s “little broadband” Internet connection at their home. These corporate network services often require 35-50 megabit connections to support videoconferencing and real time data sharing.

This report presents the information that Bozeman needs to make an informed decision about strategic investments in modern broadband infrastructure. For the City, business retention and new business attraction can only be accomplished if the area has the right telecommunications infrastructure that will enable area businesses to compete in the global economy.

<table>
<thead>
<tr>
<th>City of Bozeman 30 Year Telecom Expenditure Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households still on dial-up</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Total households</td>
</tr>
<tr>
<td>Total businesses</td>
</tr>
<tr>
<td>Household Percentage</td>
</tr>
<tr>
<td>Number of households</td>
</tr>
<tr>
<td>Annual cost/household</td>
</tr>
<tr>
<td>30 year expenditure</td>
</tr>
<tr>
<td>Total residential expenditures</td>
</tr>
<tr>
<td>Total expenditures(^1)</td>
</tr>
</tbody>
</table>

**What is Broadband?**

There is much confusion about the “true” definition of broadband. From the perspective of economic development, there can be no upper limit on the definition of broadband. Saying that broadband (as an example) is 5 megabits/second of bandwidth or 10 megabits/second is to immediately tell businesses in the city that there will be structural limits on their ability to do business in the future—it is dictating the size of truck that can be used to deliver goods and services. Here is the only appropriate definition of broadband:
Broadband is whatever amount of bandwidth is needed to support a business' ability to compete in the global economy.

Broadband is a community and economic development issue, not a technology issue. The essential question is not, "What system should we buy?" or "Is wireless better or cheaper than fiber?" Instead, the question is:

“What do Bozeman businesses and residents need to be able to compete globally over the next thirty years?”

In short, Bozeman today has "little broadband" in the form of DSL and cable modem service, along with a very limited amount of "big broadband" in the form of fiber to a few large businesses and institutions.

If Bozeman is to make investments in broadband and telecommunications infrastructure, it is absolutely critical that those investments are able to scale gracefully to meet business and economic development needs for decades. This drives the solution towards an integrated fiber and wireless system, rather than a wireless only service orientation. Wireless is able to provide basic Internet access needs, but is not able to support advanced video and multimedia services. Some off the shelf business videoconferencing systems in use today require a minimum of 50 megabits of bandwidth–beyond the capabilities of any affordable wireless system (cellular data networks are approaching this level of bandwidth at off-peak times, but with punishingly expensive bandwidth caps). Two key concepts that should drive community investments in telecom are:

“Bandwidth is not the Internet

Bandwidth is not a fixed number

Broadband and “the Internet” are often used interchangeably, but this has led to much confusion. Broadband refers to a delivery system, while “the Internet” is just one of many services that can be carried on a broadband network. The challenge for communities is to ensure that businesses and homes have a broadband network with sufficient bandwidth to deliver all the services that will be needed and expected within the next three to four years, including but not limited to “the Internet.”

Bandwidth needs for the past decade have been growing by 25% to 50% per year, and show no sign of slowing. As computers and associated hardware (e.g. video cameras, audio equipment, VoIP phones) become more powerful and less expensive, new applications and services are continually emerging that drive demand for more bandwidth. The table below indicates the likely growth in bandwidth, based on current uses, emerging high end equipment, and research lab/university/government networks already deployed and in use.

From a report by the Information Technology and Innovation Foundation (March, 2009), listed below are the bandwidth requirements for services already commonly in use and for emerging services like telepresence business videoconferencing.
<table>
<thead>
<tr>
<th>Application/Service</th>
<th>Upstream Bandwidth Requirement</th>
<th>Downstream Bandwidth Requirement</th>
<th>Total Combined Bandwidth Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium resolution videoconferencing</td>
<td>1.2 megabits</td>
<td>1.2 megabits</td>
<td>2.4 megabits</td>
</tr>
<tr>
<td>Streaming video (720p)</td>
<td></td>
<td>1.2 megabits</td>
<td>1.7 megabits</td>
</tr>
<tr>
<td>Standard definition TV</td>
<td>4 megabits</td>
<td></td>
<td>4.25 megabits</td>
</tr>
<tr>
<td>Basic HD videoconferencing (720p)</td>
<td>1.2 to 4 megabits</td>
<td>1.2 to 4 megabits</td>
<td>2 to 8 megabits</td>
</tr>
<tr>
<td>Telepresence high resolution HD videoconferencing</td>
<td>5 megabits</td>
<td>5 megabits</td>
<td>10 megabits for 2 attendees, 15 meg for 3 attendees</td>
</tr>
<tr>
<td>Video home security service</td>
<td>10 megabits</td>
<td></td>
<td>2.5 to 5 megabits</td>
</tr>
<tr>
<td>HD digital television (1080p)</td>
<td></td>
<td>15 megabits</td>
<td>5 to 10 megabits</td>
</tr>
<tr>
<td>Telepresence very high resolution HD videoconferencing (1080p)</td>
<td>15 megabits</td>
<td>15 megabits</td>
<td>30 megabits for 2 attendees, 45 megabits for 3 attendees</td>
</tr>
<tr>
<td>4K digital television</td>
<td>1 megabit</td>
<td>19 megabits</td>
<td>20 megabits</td>
</tr>
</tbody>
</table>

Note that the business videoconferencing services all require symmetric bandwidth. This is a critically important issue, as current incumbent “little broadband” services like DSL and cable modem systems do not offer symmetric bandwidth (where the upstream and downstream bandwidth is equal). Using this information we can project what Bozeman homes and businesses will need in the coming years.

<table>
<thead>
<tr>
<th></th>
<th>Next 2-4 years</th>
<th>Next decade</th>
<th>Twenty years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small business needs (1-9 employees)</td>
<td>10-25 megabits of symmetric bandwidth and 5-10 megabits of Internet access</td>
<td>100 megabits of symmetric bandwidth and 20-40 megabits of Internet access</td>
<td>Gigabit+ symmetric bandwidth and 50 to 100 megabits of Internet access</td>
</tr>
<tr>
<td>Medium-sized business needs (10-100 employees)</td>
<td>Next 2-4 years</td>
<td>Next decade</td>
<td>Twenty years</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>50–100 megabits of symmetric bandwidth and 10-20 megabits of Internet access</td>
<td>Gigabit symmetric bandwidth and 50 to 100 megabits of Internet access</td>
<td>Multiple gigabit symmetric circuits and lightpaths and 100+ megabits of Internet access</td>
</tr>
<tr>
<td>Large business needs (100-1000+ employees)</td>
<td>Gigabit+ symmetric bandwidth and 100+ megabits of Internet access</td>
<td>Multiple gigabit symmetric connections and 250 to 500 megabits of Internet access</td>
<td>Multiple gigabit symmetric circuits and lightpaths and 1 Gigabit+ of Internet access</td>
</tr>
<tr>
<td>Residential needs</td>
<td>25-50 megabits of symmetric bandwidth and 4-8 megabits of Internet access</td>
<td>100 megabits of symmetric bandwidth and 20-30 megabits of Internet access</td>
<td>A Gigabit symmetric circuit and/or lightpaths, with 50 to 100 megabits of Internet access</td>
</tr>
</tbody>
</table>

**Next Generation Connectivity**

“Next generation” is the term used to describe future planning for the next step in network connectivity and infrastructure. Pulling fiber deeper into neighborhoods and providing greater access to connectivity allows the infrastructure to be in place to accommodate future communication needs, services, and innovations. Because of the U.S. demographic bulge that occurred during the baby boom after World War II caused exurban migration, the U.S. is currently the only country where fiber is being deployed in largely suburban areas with single family homes. In countries like Japan and South Korea, fiber to the apartment is widely available, in part because the cost of delivering fiber to a high rise apartment building that might have 500 subscribers is much lower than the build cost of fiber to 500 single family homes in a sub-division. Next generation broadband reaps substantial benefits:

- Dramatically faster file transfer speeds for both uploads and downloads
- The ability to transmit streaming video, transforming the Internet into a far more visual medium
- Means to engage in true-real time collaboration
- The ability to use many applications simultaneously
- Ability to maintain more flexible work schedules by being able to work from home on a part time or full time basis
- The ability to obtain health-related services for an occasional illness and/or long term medical services for chronic illnesses.

Clearly, consumers have a strong interest in a visual medium from when and wherever they are. YouTube is the second most popular search engine after Google, which demonstrates the need to support the infrastructure to transmit streaming video.
In addition to video streaming, true-real time collaboration also provides an effective way for people to interact from wherever they are. People can engage in a two-way, real-time collaboration, so that fruitful, visual conversations can be held between friends, family, business associates from the state, country, or internationally.

Because of fiber networks, employees have the capabilities of working from their home. Findings suggest that if all Americans had fiber to the home, this would lead to a 5 percent reduction in gasoline use, a 4 percent reduction in carbon dioxide emissions, $5 billion in lower road expenditures, and 1.5 billion commute hours recaptured.

SERVICE AND GAP ANALYSIS

BUSINESS BANDWIDTH NEEDS

The next table shows bandwidth consumption for several types of businesses and a projection of the bandwidth needed 5 and 10 years out. The cost of fuel is already affecting business travel decisions, and more and more businesses will invest in HD quality business videoconference systems to reduce the need for travel. These HD systems require substantial bandwidth; a two way HD video conference requires 20-25 megabits during the conference, and a three way conference requires 30-35 megabits during the conference. As more workers try to reduce the cost of driving to and from work by working part or full time from home, the business location must provide network access (Virtual Private Network, or VPN) to the employees working from home. These home-based workers will make extensive use of videoconferencing to attend routine office meetings remotely and to enhance communications with co-workers, including videoconferences with other home-based workers in the company. A VPN network providing remote access to just two or three home-based employees could require 50 megabits of bandwidth during normal work hours.

<table>
<thead>
<tr>
<th>Description</th>
<th>Large Business</th>
<th>Small Business</th>
<th>Home Based Worker</th>
<th>Business From Home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concurrent Use</td>
<td>Concurrent Use</td>
<td>Concurrent Use</td>
<td>Concurrent Use</td>
</tr>
<tr>
<td></td>
<td>Mbps</td>
<td>Mbps</td>
<td>Mbps</td>
<td>Mbps</td>
</tr>
<tr>
<td>Telephone</td>
<td>20</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TV</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HDTV</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Credit Card Validation</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Security System</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Internet</td>
<td>20</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Bozeman Fiber Initiative Overview
<table>
<thead>
<tr>
<th></th>
<th>Large Business</th>
<th>Small Business</th>
<th>Home Based Worker</th>
<th>Business From Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPN Connection</td>
<td>5</td>
<td>25</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Data Backup</td>
<td>5</td>
<td>7.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Web Hosting</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Workforce Training</td>
<td>2</td>
<td>20</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>(online classes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD Videoconferencing</td>
<td>10</td>
<td>100</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Telecommuting workers</td>
<td>5</td>
<td>15</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Totals</td>
<td>205.0</td>
<td>49.6</td>
<td>18.3</td>
<td>23.3</td>
</tr>
<tr>
<td>5 years from now (megabits)</td>
<td>615</td>
<td>149</td>
<td>55</td>
<td>70</td>
</tr>
<tr>
<td>10 years from now</td>
<td>1845</td>
<td>446</td>
<td>165</td>
<td>210</td>
</tr>
</tbody>
</table>

**Residential Bandwidth Needs**

The table below depicts the bandwidth needed for typical residential services which are available now or will be available in the near future. In a next generation network all services will be delivered over a single network infrastructure which will require an access network that can support providing most services to most consumers simultaneously. Today’s shared networks (cable and wireless in particular) rely on the “bursty” nature of traffic to provide services to end users. If all end users were consuming their “advertised” bandwidth today’s cable and DSL networks would grind to a halt.

In fact, they already are; some cable providers have begun to receive heavy criticism for undocumented manipulation of data traffic. Existing cable modem network users are overwhelming the digital cable networks that were upgraded as little as three or four years ago, and the firms have had to artificially reduce the bandwidth available for certain kinds of high bandwidth services (e.g. peer to peer file sharing). Some cable providers have even run into capacity issues with the TV portion of their networks, and some consumers have observed that some HD TV channels have been so highly compressed that picture quality has been noticeably degraded when compared to the same channel delivered by satellite.

The table below is designed to show bandwidth consumption in several scenarios. Network design requires a system than can meet peak demand across the entire network, meaning the network must be able to deliver peak bandwidth demand to a majority of households at the same time. Super Bowl Sunday is a typical example of a day when a majority of households may be watching a video at the same time. Political debates, season finales of popular shows, and even a typical Saturday afternoon during college football season may see many households trying to access multiple channels of video simultaneously. This table shows the severe gap between current DSL, wireless, and cable modem options in the City of Bozeman and projected future demand.
### Economic Impact Potential

Other communities across the United States are already actively pursuing new and innovative public/private partnerships to improve the access and affordability of telecom services delivered via broadband. The Fiber To The Home Council maintains statistics on the growth of residential fiber in the United States. About 13 million premises have been connected with fiber, but that represents only about 12% of American homes. The deployment of fiber is highly dependent upon location, so some densely populated urban areas, primarily on the East Coast, are getting fiber much more rapidly than other areas of the country.

Communities that have affordable broadband are enjoying a faster rate of economic growth than communities that lack broadband, based on a CMU/MIT study (Measuring the Economic Impact of Broadband Deployment, Sirbu and Gillett, 2006).

A more recent study (2014) by David Sosa of the Analysis Group found that the availability of next-generation broadband speeds provided by Gigabit fiber substantially improves a
community's gross domestic product. The study examined 55 cities in nine states and
discovered an economic boost in all 14 communities where gigabit service was widely available.
Those 14 cities displayed per capita GDP about 1.1 percent higher than the other 41
communities with limited or no access to gigabit broadband, equating to about $1.4 billion in
additional GDP. The report stated, "Next-generation broadband is likely to have a substantial
impact on economic output and, consequently, consumer welfare."

In Kansas City, the site of Google’s first fiber initiative, KCnext President Ryan Weber said that
Google and AT&T plans to offer Gigabit fiber in the city will result in several perks. Weber
noted that competition is a very good thing when it comes to providing utilities like fiber:

“When businesses relocate to an area, that is now a big part of the conversation — access to
fiber. They want to make sure there are a number of carriers because for some tech companies,
they have two carriers coming into their office.”

A Brookings Institution study (Crandall, Lehr, and Litan) in 2009 found that for every 1%
increase in the availability of broadband in a community, the level of employment increases
correspondingly by .3% annually. The study also found that as the level of Internet users
increased in a community, there was a corresponding increase in economic growth, with a 10%
increase in Internet use yielding a 1.3% increase in the economy.

A new digital divide is emerging, with fiber as a differentiator. Communities with affordable
broadband infrastructure and the ability (i.e. fiber) to expand capacity as demand grows over
the next seven to ten years should enjoy a measurable economic development advantage over
communities that lack such infrastructure.

**JOB CREATION AND RETENTION**

As businesses inevitably rely more on dependable access to telecommunications to sustain their
trade, they are also seeking fast and affordable networks as well. In many cases, cable and DSL
companies are monopolies within a community. Unsurprisingly, these companies are able to
provide unreliable and slow networks, since customers have no other choice but to purchase
their products. As a result, numerous communities have taken the issue into their own hands
and built their own networks. Communities are able to control the connections and the
reliability of the services. Ultimately, affordable access to reliable internet services is a catalyst
for economic growth and job creation.

▶ Chanute, Kansas (Chanute Municipal Network): One of the reasons why Spirit
AeroSystems chose Chanute for their new manufacturing facility is because of their
leading broadband infrastructure. As a result, the plant created over 100 new jobs.

▶ Bristol, Virginia (Optinet): This community has a publicly owned network that at-
tracted companies like CGI and Northrup Grumman. These companies not only cre-
ated 700 jobs, but also paid twice the average wage in the community due to the con-
vienience of the network.
Springfield, Missouri (SpringNet): When a carrier failed to meet the demands of Springfield, SpringNet was created and ultimately served to provide the necessary connectivity to create over 400 jobs to the community.

Chattanooga, Tennessee (EPB Fiber): According to an academic study, the first ten years of the EPB fiber network will produce over 3,600 new jobs correlated with the City’s high speed Internet, phone, and television services.

Palm Coast, Florida was able to retain the city’s largest employer (over 500 jobs) because the city-owned open access fiber network sharply reduced the cost of Internet access within the city.

Scott County, Minnesota was able to attract a major manufacturer and more than 500 new jobs by providing county-owned fiber to connect four of the company’s plants.

**PUBLIC SAVINGS**

When local governments build their own networks, they experience increased savings and greater redundancy and reliability. How? Since the local governments own the network, they have the leverage to determine the future costs and when these price hikes would occur. Community anchor institutions like schools, libraries, and government facilities may reap the greatest savings because they are no longer contracted to sign a lease to join a network.

**Martin County, Florida:** Once the initial capital investment in the fiber asset is paid off, Martin County School District will save nearly $340,000 per year. In other words, the school district will only pay an estimated $6,000 per year for a gigabit connection to 26 locations.

**Bristol, Virginia:** One study concluded that Bristol schools have saved $1 million from 2003-2008 just by self-provisioning phone services. This results in nearly $10 million in savings for the community.

**Martinsville, Virginia:** Similarly to Bristol, Virginia, Martinsville saves between $130,000 and $150,000 annually because they do not need to lease telephone lines.

**Medina County, Ohio:** When data needs were fulfilled by Time Warner Cable, Highland Public Schools spent $100,000 per year for the company’s services. However, the county saved $82,000 in 2012 when it switched over to the Medina County municipal network since the cost was only $18,000 per year.

**The City of Wilmington, North Carolina:** uses its fiber network to turn the lights off at sports parks at night. Cameras have been placed at every sports and recreation field, along with remote control light switches. A single City employee can quickly check the cameras to see if anyone is still at a field, and if not, a couple of mouse clicks turn off the lights. The City expects to save $800,000 per year on electricity costs.
Why Move Forward?

**SETTING A VISION FOR THE FUTURE**
A modern business-oriented, high performance Gigabit network in Bozeman would have the following characteristics.

**EXPANDED BANDWIDTH**

**IN BOZEMAN**
As a long term goal, businesses in Bozeman should have as much bandwidth as they need to market and sell their services globally. General availability of Gigabit fiber to most business locations is needed to support the business class services that are being requested by commercial and retail businesses in Bozeman. Unlike roads, water, and sewer systems, fiber capacity can be increased incrementally as needed without incurring additional construction costs, making it a reliable and secure long term investment.

**REGIONAL AND NATIONAL CONNECTIONS**
Bozeman currently has limited competitive long haul fiber services available in the community—an economic development advantage that could be improved. Getting good connections in and out of an area is often a very difficult challenge for many communities, but improved local business access to fiber would create more competition for data traffic in and out of the city: a key economic development benefit. The challenge is to leverage more local connections to these fiber networks to drive down local broadband service costs, which will in turn help attract businesses and jobs.

**SYMMETRIC BANDWIDTH**
To support business needs, it is critical to have affordable service options that offer symmetric bandwidth: that is, equal upstream and downstream data capacity. Most current broadband systems restrict upstream data capacity to a fraction of the downstream capacity—upstream capacity is often only 10% of downstream capacity. These limits restrict economic development, entrepreneurial activities, and work from home opportunities. Increased access to fiber services via modest investments in telecom infrastructure can help retain existing businesses and attract new ones, especially in Bozeman’s downtown core.

**WIDESPREAD AVAILABILITY**
Widespread availability of broadband should be an important goal for Bozeman. Over time, high performance network connections should be available at most business locations. Broadband is increasingly being used to make relocation decisions.
AFFORDABILITY
It is more efficient from both network and financial perspectives to provide some basic infrastructure on a shared basis—leasing that infrastructure to private sector providers. Community investments in basic infrastructure allow service providers to offer services at lower cost because their capital expenses have been reduced substantially while increasing their access to a much larger, aggregated market.

SUPPORT FOR A WIDE RANGE OF SERVICES BEYOND “TRIPLE PLAY”
Telecommunications services have undergone a massive transformation in the past fifteen years, and that change will continue for at least an additional ten years as all services formerly delivered over narrow bandwidth analog networks (i.e. the traditional “triple play” of Internet, TV and telephone) are delivered over wide band digital networks. Many new services (e.g. YouTube, iTunes Music Store, VoIP phone services) were not anticipated or predicted by most industry pundits just ten years ago. Newly emerging high bandwidth services include a wide range of telemedicine and telehealth services, new kinds of online entertainment options, and many more kinds of business and ecommerce services. Any telecom infrastructure investments undertaken must be capable of supporting a wide range of future services that are going to emerge but cannot be predicted precisely.

COMPETITIVE MARKETPLACE
Increased awareness of alternative service providers via carefully targeted pilot project fiber investments will help lower costs for businesses. This will increase the kind and type of service offerings while keeping prices lower than those in communities without a competitive marketplace for telecom and broadband services. This will make Bozeman more competitive from an economic development perspective and help to retain existing businesses and jobs and also help to attract new residents and businesses to the area.

LIMITED GOVERNMENT INVOLVEMENT
Investments should be limited to providing basic infrastructure; services provided to businesses and residents should be offered by private sector service providers. Incumbent providers as well as other interested firms should all be invited to use this “open access” community-provided infrastructure to sell current services and new, innovative services both to existing customers in Bozeman and new customers. This approach will keep elected and appointed officials out of the business of providing telecom services directly to the public. Communities where the local government has chosen a “municipal retail” approach, where residents and businesses buy telecom services (e.g. telephone, Internet, TV) directly from the local government have often
been sued by incumbent providers on the grounds that public funds should not be used to compete directly with the private sector.

**Benefits of Moving Forward**

**Business Attraction**

Chattanooga and Kansas City have both reported that the “big broadband” Gigabit fiber available in both locations has brought new businesses. Many of these new businesses are owned by entrepreneurs that deliberately moved to one of the two cities to take advantage of the high performance networks and the associated low cost of connectivity.

A near term effort to deploy fiber widely in Bozeman would give the City an edge in business attraction, but as more communities make similar investments, this opportunity will degrade over time.

**Business Retention**

If fiber services from a wider range of providers was more widely available in Bozeman, the cost of typical businesses services like Internet and telephone will likely decline. When the Wired Road project in southwest Virginia began offering competitive services from private sector providers, prices for Internet and phone declined by as much as 60%, and many businesses found they were able to dramatically increase the amount of bandwidth they were purchasing for Internet access while simultaneously paying less. Efforts to reduce the cost of telecommunications for businesses will become more important to business retention efforts as other communities, especially those nearby, roll out Gigabit service connections and competitive pricing.

**Broadband is Green**

Broadband brings a variety of energy-saving “green” benefits:

- Reduced use of paper for some services and applications (e.g. reading newspapers and magazine on tablets, rather than the higher carbon footprint of home delivery of paper version).

- Email reduces the amount of fuel needed to deliver paper mail.

- Online shopping is more efficient in terms of delivery costs (one UPS truck can deliver packages more efficiently than individual consumers each driving a private car to the store).

- Concentrating computing resources in the high efficiency “data cloud” can reduce the amount of electricity needed by businesses and users.
Why Invest in Fiber?

A common question during the development of a community fiber project is, "Isn't wireless less expensive?" In this section, we provide an analysis of all the wired (copper-based, fiber-based) and wireless technologies that are in use or in near term deployment.

Fiber is a “future proof” infrastructure investment with a useful minimum life of thirty to forty years when installed properly. The capacity of fiber has been and will continue to be expanded regularly without incurring additional construction costs (by changing the equipment). This is in contrast to other community infrastructure systems like water and sewer that require massive and expensive upgrades to the water or sewer lines once the capacity of those lines has been reached.

We are now seeing even small and medium-sized businesses asking for redundant and reliable fiber connections. Without ubiquitous and affordable fiber infrastructure, Bozeman will not be economically competitive. Communities that already worry about losing too many young people to other areas have much more to worry about. Fiber is the only transmission system that will be able to deliver all the services businesses and residents will expect and demand in just a few years. Communities that choose to delay fiber infrastructure investments will be at a severe disadvantage in the next several years when trying to attract and retain businesses and workers.

From an economic development perspective, fiber is the only technology that offers both very high bandwidth capacity and high security. If Bozeman wants to attract and retain high tech firms developing cutting edge, proprietary systems and data, fiber is the only viable business class infrastructure.

TELEPHONE/DSL

DSL (Digital Subscriber Loop) technology utilizes existing copper twisted pair telephone lines to provide broadband services. There are many variants of DSL, and the differences among them are primarily bandwidth and distance. Most DSL systems are limited to a maximum of 18,000 cable feet from a telephone switch or remote access module (DSLAM). Faster variants of DSL are limited to as little as a few thousand feet, making the service areas inconsistent from a subscriber perspective. A neighbor a few houses away from a home with DSL service may be told that no DSL service is available (because of the cable limitations). Current low cost DSL residential service offerings are priced competitively compared to cable modem service, but also tend to be much slower.

Because of the requirement to deploy DSL equipment close to subscribers, rural areas are at a distinct disadvantage for DSL. It is not uncommon in rural areas to have cable runs of many miles (from a telephone switch), making DSL impractical without substantial equipment upgrades. Another problem in rural areas is the age of the telephone cable plant. Even if a home or business is located within the prescribed distance to DSL equipment, older copper
twisted pair cable may not be capable of handling the DSL signal properly. In some cases, speed of the service is degraded, and in other cases, DSL may not work at all.

The primary problem with DSL is the lack of capacity over the long term. In an optimum DSL situation, with high quality cable plant and subscribers close to DSL switches, the fastest DSL is limited to 15 to 20 megabits under these optimum conditions. Most homes will never be able to receive DSL services at those speeds because of sub-optimal service conditions. DSL cannot provide the capacity needed by businesses and residents in the near future.

**CABLE SYSTEMS**

Cable systems that provide broadband in most U.S. communities use what is called HFC systems, or Hybrid Fiber Coaxial systems. Typically, fiber delivers television and broadband signals to equipment located in or near a neighborhood, and copper coaxial cable is used to connect the subscriber’s home or business with the equipment fed by fiber. Cable systems have never been widely deployed outside community boundaries (residential neighborhoods and business districts) because of the high cost of placing equipment near subscribers. In this regard, cable systems are limited in the same way that DSL systems are limited, and rural communities are at a distinct disadvantage because of the lower density of homes and businesses.

Cable systems also cannot provide the future capacity that will be required by homes and businesses in the near future. Some cable companies have begun to announce pilot projects offering Internet access at speeds “up to 50 megabits.” While this is an improvement over current offerings advertised typically at bandwidth “up to 6 megabits,” this bandwidth is always shared among all users on a node. It is not unusual to have between 100 and 500 users (typically residential homes) on a single node. The advertised bandwidth (e.g. “up to 6 megabits”) is shared among all users on a node, meaning that the usable per household bandwidth during peak use times like early evening is much lower.

Cable modem service also typically has asymmetric bandwidth, meaning that the advertised bandwidth (“up to 6 megabits,” or “up to 50 megabits”) is only available on the downstream side, coming into a home. The upstream bandwidth available to users to send data and content is often 1/10th of the downstream capacity. This makes most cable modem systems unsatisfactory for many kinds of work from home services and applications that require more balanced upstream and downstream bandwidth, like videoconferencing, which works best if the bandwidth is symmetric (the same capacity in both directions). This issue of symmetric bandwidth will become increasingly important as the cost of fuel changes commuting patterns and more people want to work from home part or full time.

**SATellite**

Satellite broadband is a wireless technology, and to avoid confusion, systems like WiFi are often referred to as terrestrial wireless. Satellite broadband uses geostationary satellites located 22,500 miles above the earth, and data traversing a satellite system has a 45,000 mile loop (up
and down). As fast as radio signals are, this distance still introduces latency (time delays) that can cause problems with real time transmission of telephone (VoIP) and videoconferencing. Bandwidth is generally less than what is available from DSL or cable systems, with a typical residential service offering 700 kilobits/second downstream and 128 kilobits upstream for between $55 and $65 per month. Higher speeds (e.g. 1 megabit/second downstream and 200 kilobits upstream) are also available for $10 or $20 per month additional.

If a home or business already has satellite television service, a second small dish antenna is needed for broadband service. Some companies have tried combining both services on a single dish, but this has usually had poor results because of signal and satellite position issues. Inclement weather (e.g. heavy rain, snow) can degrade or temporarily cut off satellite signals.

There are two primary providers of satellite broadband in the United States: Hughes Network Services and Wild Blue. Wild Blue has partnered with many rural electric coops, with the coops acting as sales agents and installers. Hughes uses independent small businesses as installers and resellers. Despite some limitations, satellite is an excellent broadband service option in underserved areas; no major infrastructure investments are required to obtain service, and speeds are much better than dial up, and in some cases may be equal to or better than entry level DSL service packages. Satellite is not a business class service option for most businesses due to the asymmetric connections, and low bandwidth, and satellite still remains relatively expensive compared to wired or terrestrial wireless service.

**BPL**

Broadband over Power Lines (BPL) was widely viewed a few years ago (circa 2005) as a very attractive alternative to fiber. Since then, most companies making BPL equipment have gone out of business. The technology was found to be expensive and trouble-prone. More recently, the concept has been revived for in-home use, where some of the technological problems can be overcome more easily than in a wide area electric grid.

BPL equipment designed for in home use transfers the broadband signal delivered by DSL or cable to different rooms in a home or business using the electric wiring. To provide service to a neighborhood, some electric companies use a system similar to cable systems, where fiber is used to get broadband near a cluster of homes, and then the signal is carried over electric lines for the last few hundred yards or last mile or two. In some other systems, the signal is carried via electric cables all the way from a broadband head end.

BPL has many of the same limitations as DSL and cable modem services. It is copper-based, and is limited in the amount of bandwidth that the technology can deliver. It requires technicians who have extensive training and experience working with high voltage systems, since special bridges are installed at every neighborhood transformer (which also makes it a relatively expensive service). Some electric coops are considering BPL as a way to quickly provide some form of broadband to their rural customers. BPL’s main advantage is that no new cable must be laid to deliver the service to a home or business. However, like DSL and cable systems, BPL is not a long term solution.
In a conversation with a rural electric coop that had been “experimenting” with BPL for more than two years, the coop representative shared that they were only able to achieve about 250 kilobits of throughput over distances of twelve miles. While 250 kilobits is better than dial up, it will not meet the long term needs of rural residents and businesses.

**FIBER**

Fiber is a future proof investment. The upper limit of fiber capacity has not yet been found, and off the shelf hardware can handle thousands of times the needs of an average home or business well into the future. Fiber has a life expectancy of thirty to forty years, and may last much longer than that; every year, the number goes up as fiber systems installed in the 1970s continue to perform adequately. A single fiber can carry all the traffic and services needed by a home or business, including voice telephone service, television programming, live videoconferencing, and HD television.

Fiber's primary drawback is its apparent high cost compared to other systems. Fiber is often unfairly compared to wireless, with the misleading conclusion that wireless is much cheaper. Regrettably, most fiber versus wireless studies compare the start up costs for wireless to the thirty year life cycle costs of fiber infrastructure. During a thirty year period, fiber is installed just once, while wireless systems will have to be replaced entirely several times. Properly costed over a thirty year period, fiber is actually less expensive than wireless, with many times the capacity.

Metro Ethernet is a point-to-point service provided over two fiber optic strands (single fiber technology is available but the hardware is quite expensive and still relatively unused). Metro Ethernet networks can deliver service as far as 25 miles from network element locations in speeds up to 10 Gigabits per second (10GB Metro Ethernet circuits are now commonly available from some providers).

SONET or Synchronous Optical Network is a point-to-point technology usually deployed in a bi-directional redundant ring. Most carrier and tier 1 service provider backbones are configured in a redundant ring. A SONET ring is self healing (provided that only one link is cut). SONET circuits are considered expensive and are usually a last resort if other fiber optic services are not available.

A Passive Optical Network, or PON, is a fiber optic network based upon a splitter technology. A single PON port can support up to 64 customers utilizing either daisy chained splitters or a central splitter location. For service providers PON is cost effective as it allows the service providers to create “fiber light” networks and fewer network elements. However, PON has many drawbacks including bandwidth limitations due to the shared nature of the feeder fibers as all customers fed from a splitter share bandwidth over a single fiber (or single pair in some networks). A major drawback of PON is the upgradeability of the network which usually requires additional feeder fiber to be deployed which is costly as it is considered a “forklift upgrade.”
We are now seeing even small and medium-sized businesses asking for fiber connections. Without ubiquitous, affordable, redundant and reliable fiber infrastructure, communities will not be economically competitive. Communities that already worry about losing too many young people to other areas have much more to worry about. In a recent college class, a professor asked 30 students how many would live in a community without broadband, and not a single student raised a hand. Fiber is the only transmission system that will be able to deliver all the services businesses and residents will expect and demand in just a few years. Communities that choose to delay fiber infrastructure investments will be at a severe disadvantage in the next several years when trying to attract and retain businesses and workers.

**The Wireless Broadband Debate**

We do not subscribe to the wireless vs. fiber debate. We believe both wireless and fiber systems are required in communities. Virtually everyone, within a few years, will have a very capable wireless device that supports phone service, email, Web browsing, gaming, TV, music and a host of other services. Residents and businesspeople will expect these devices to work everywhere; this means communities will need a well-designed wireless network of towers, antennas, and related systems, including fiber backhaul. A fiber connection is needed to get the wireless signals onto the Internet from local wireless access points; fiber can be used to dramatically improve wireless performance by providing a very fast connection from the wireless radios to the rest of the network. Wireless systems work best when supported by a fiber backbone to carry traffic to and from its destinations. Fiber and wireless systems are complementary, not competitive.

Wireless is often touted as a broadband panacea. Across the country, many communities are rushing to offer some kind of wireless system. These municipal wireless systems often lack sustainable business plans, and many well publicized projects are beginning to have problems. St. Cloud, Florida offers free wireless broadband throughout the city, but the quality of the service tends to be inconsistent, and many residents have refused to give up paid cable and DSL service. Philadelphia’s well known project found that more access points are needed than originally anticipated, and the private firm that promised to operate and maintain the network pulled out, forcing the City government to take over an expensive system that was not able to deliver the connectivity that residents expected.

Current wireless systems lack the capacity to handle high bandwidth services like video when more than a few people are using the same access point. Systems like WiMax are very expensive, and while prices will decline, when costed over a reasonable life cycle, wireless systems are relatively expensive. Wireless systems are inherently less secure than cable based systems, and we never recommend that a business uses a wireless connection for its primary access unless no other alternative exists. The primary future use of wireless will be for mobile access to services, rather than fixed point access. In under-served areas, properly designed wireless systems are an excellent first step, but are not a complete solution over the long term. Over time, wireless to the home will have to be replaced with fiber connections to meet
demand, but wireless will remain important for mobile access to broadband (e.g. access to the Internet and email from mobile phones and laptops).

**Wireless Technology Trends and Issues**

Over the past several years, numerous communities large and small have attempted to build and operate municipal wireless Internet services. Large cities like San Francisco and Philadelphia announced ambitious plans to build WiFi “blankets” to provide wireless Internet access to most homes and businesses. Smaller cities like St. Cloud, Florida and Sandoval County, New Mexico have also built municipal WiFi systems. There are now a wealth of lessons learned from these early efforts:

- WiFi is expensive if you truly want total coverage. Many WiFi projects have underestimated the number of access points that are needed—something that is causing problems with the much touted Philadelphia WiFi effort. Some contractors and vendors may be underestimating the number of access points to keep costs lower, so it is important to be realistic during planning stages about what a community can afford to do in terms of deployment of access points.

- WiFi is not a first choice for business class services. Few businesses of any size are willing to run their business on a WiFi connection unless the only other option is dial-up. It may be adequate for small one or two person businesses, but most businesses want a more secure and more reliable wired connection.

- Wireless vendors have to be selected carefully. Sandoval County, New Mexico experienced severe problems with two different wireless firms hired to build a wireless Internet system—both firms were unable to provide a working system and within budget.

- WiFi has reliability problems. Even if you are in range of an access point, foliage on trees, building walls, rain, snow, and other access points can degrade the signal. Because WiFi is an unlicensed service, anyone can run an access point. The popular and very common home wireless routers can cause interference and slow down other access points.

- WiFi, even the newer G and N services, can’t handle video very well, and this limits the potential of such a service to be financially viable. A community broadband system has to have a solid business model that is financially sustainable, and that means being able to carry business and residential video services.

- WiMax is a newer set of frequencies and power standards that are widely advertised as a silver bullet for broadband, but there is nothing magic about WiMax. It uses many of the same frequencies that WiFi does, meaning that it still requires clear line of sight to get an adequate signal. WiMax radios can use both licensed and unlicensed frequencies, and the unlicensed frequencies will suffer from the very same interference problems from which WiFi suffers. WiMax has not been widely deployed and is likely to be superseded in some areas by LTE (Long Term Evolution), a cellular wire-
less technology that offers equivalent bandwidth and has the advantage of supporting
traditional cellular voice services.

Licensed WiMax frequencies perform better because there is less interference, but this
presumes the licensed frequencies are available (some other private or public entity
may have licensed the frequencies for a particular geographic area). The licenses, if
available, may cost several thousand dollars to purchase and then there is an annual
renewal fee.

WiMax and LTE capacities and distances are widely exaggerated. It is very common
to see promises of “up to 80–100 megabits” of capacity and distances of “10 to 20
miles." With respect to bandwidth, that 100 megabits of capacity will be shared
among all connected users, so if 100 households are trying to access the network via a
single WiMax access point, the usable bandwidth may be more like 2–4 megabits per
household or per user. Distances are limited by line of sight. Both WiFi and WiMax
signals will work over many miles, but only with narrow angle antennas and clear line
of sight. While WiFi can easily reach ten miles or more with clear lines of sight, and
WiMax can reach twenty miles with clear line of sight, in practice these optimum dis-
ances are rarely achieved; it is more realistic to consider WiFi usable over 2–4 miles
and WiMax over 4–8 miles. Tree cover is particularly problematic, and it is often nec-
essary to remove tree limbs, an entire tree, or to relocate the antenna in order to get a
good signal.

LTE and television “white space” systems are emerging standards that can provide
connectivity at much longer distances (five to ten miles is possible under ideal circum-
stances) and the radio frequencies used are better able to penetrate at least some foli-
age. Bandwidth of several megabits will be possible, and will compare very favorably
with copper-based systems like DSL. But even these systems will have a very limited
ability to handle TV programming, interactive videoconferencing, and other business
class services.

Wireless services will be important in rural areas. And wireless is not going away; it will remain
as an important component of a well-designed community broadband system—as a mobility
solution. As we travel around the community, we want to be able to access the Web, check
email, make phone calls, and do other sorts of things. Wireless services enable that, and in rural
areas, wireless services are an important step up from dial-up.

*Communities need to regard telecom as essential public infrastructure, critical to community and
economic development.* And that well-designed community infrastructure includes both wireless
access and eventually fiber to every home and business. With the right business model and
careful financial planning, such systems can show a reasonable payback period while lowering
the cost of telecom services.
Business Models and Ownership

There are three business/ownership models that are in common use for both public and private sector networks. These are Private Sector Only, Municipal Retail, and Wholesale Multi-Service.

Because virtually any modern broadband network (and most older telecom networks) use public right of way for a large portion of network distribution, ALL business models are “public/private partnerships.” The notion of the public/private partnership is not a distinct business model, but rather exists along a continuum, with minimal public involvement on one end (i.e. only use of public right of way) to full public ownership on the other end.

PRIVATE SECTOR ONLY

The “leave it to the private sector” model has obvious shortcomings, which is why so many communities are now beginning to consider telecom as essential public infrastructure. Private sector firms have a primary responsibility to preserve and enhance shareholder value. They do not make operational and service area deployment decisions based on community and economic development needs. For many communities, this has meant that broadband services have lagged well behind the rest of the world and places those communities at a competitive disadvantage when trying to attract or retain businesses.

The private sector model requires overbuilding, which means that each service provider must build its own network end to end to serve customers. This leads to completely duplicated networks, which increases costs and makes it more difficult for these firms to make a business case for enhanced services in many areas. This business model is a fundamental weakness, because these private networks are not only expensive, but typically underutilized. Residential networks are only used heavily in late afternoon and evenings, and are virtually unused overnight and during the work day. Business networks that are only used heavily during work hours typically have very low utilization for the other two-thirds of the day. School and education networks are used only 8 to 12 hours per day, and are empty the rest of the time.

Community broadband projects can overcome this fundamental weakness and substantially reduce the operating cost of networks by using a shared model, rather than a private model.

MUNICIPAL RETAIL

Also known as Muni (Municipal) Triple Play. Local government builds the network and sells services in direct competition with the private sector, offering only traditional “triple play” voice, video, and broadband. Muni triple play systems are usually closed systems that offer little choice to customers. Muni triple play systems compete directly with the private sector, and tend to have very low take rates. Opponents of community broadband often cite the low take rates of muni triple play projects to “prove” that community broadband is a poor investment. But the low take rates only show that muni triple play business models are not financially viable over the long term.
The two key issues with this model are:

- It requires local government officials and leaders to sign long term contracts (typically 5 to nine years) with the providers whose services will be resold over the network. This means that those local leaders must have a high degree of confidence that they can accurately predict, seven to nine years out, what level and quality of services the businesses and residents of the community will require. While contracts can be renegotiated as needs change, prices are likely to rise during that renegotiation.

- This model situates the local government in direct competition with incumbent providers. This not only tends to keep take rates low, which threatens financial viability, but adoption of this model also encourages lawsuits from the incumbents (Bristol, Virginia, Lafayette, Louisiana, Geneva, Illinois, and Monticello, Minnesota are examples of communities that were sued after selecting the muni retail model).

**Wholesale Multi-Service Approach**

Local government and/or an independent entity firmly vested in the long term interests of the community builds and owns the network and provides access to service providers on a wholesale basis. In turn, service providers use the network infrastructure on a wholesale basis to offer business, residential, and government/institutional customers retail services. The providers buy wholesale transport (i.e. raw bandwidth with no services—called a Layer 2 circuit) from the network, and then add their own services (e.g. Internet, voice, TV, etc.) on that circuit to their customers. Services are provisioned individually for each subscriber. This approach limits the initial investment required of a new service provider that wants to enter the market—thereby encouraging more competition and lower prices.

Issues to consider with the wholesale approach include:

- The Layer 2 provisioning approach allocates one or more circuits to each customer of each provider. Troubleshooting technical problems requires excellent network operations with NOC (Network Operations Center) staff able to sort out whether the problem is caused by customer equipment, service provider equipment, or the network itself.

- Service provider agreements have to be crafted carefully to attract providers, who want to be assured of appropriate break/fix guarantees, Quality of Service guarantees, and 24/7/365 network monitoring and support.

- Service providers require regular market and price incentives to ensure that take rate targets are met.

- The network has to maintain a regular public awareness marketing effort to ensure that businesses and residents are aware that the community-owned network offers new price and service options.

A lesson learned from communities that have implemented community broadband networks is that with both the wholesale and open services model, it is essential to ensure that a sufficient number of service providers are prepared to sell services on the network—a minimum of two is desirable during the first year of operations.
WHY OPEN ACCESS: THE MULTI-SERVICE NETWORK CONCEPT

Customer aggregation is a key advantage to a shared, community-owned telecommunications infrastructure. By building fiber to homes and businesses, the community maximizes the market potential for private providers who want to sell services. For Bozeman, the early focus should be tied to economic development goals like job creation and industry diversification. Infrastructure investments should be supporting areas where business and jobs growth is most likely to occur, as this will also help ensure financial sustainability for the network. As the revenue increases from leasing network services, the revenue that exceeds operating costs and debt can be used to expand into other areas if warranted. Residential fiber build outs can occur over time as the network expands. The community investment allows service providers to reach more customers than any single company could reach on its own. Some of the outcomes are:

- More customers -- When a community builds the transport layer of a digital road system (the roadway), each provider has a much lower cost of infrastructure needed to enter a market. In smaller towns and regions, this is a critical difference.
- Lower costs -- When a firm can reach more customers via a community broadband system, lower costs of service usually results. Typical reductions in cost in open access systems are usually on the order of 15%, and are frequently much more than that. It is not unusual to see the cost of telephone service decline by 40% or more.

Services aggregation occurs when communities build open networks, meaning that any qualified service provider can offer services using the community digital roadway. In this business model, there are usually several service providers competing for customers in each category of services (e.g. voice telephone service, TV, Internet access).

- More choice-- A natural outcome of more services is more choice for purchasers of services. Instead of a single monopoly provider of telephone or television, customers can pick and choose among a variety of service plans at various price points.
- More competition -- When more services are available, there is more competition for customers. Subsequently, service providers must sell services for the lowest possible price, and also creates incentives to provide excellent service to customers. Compare this to a monopoly environment where there is no competition and hence little pressure for a company to provide good service--customers have no other service options.
- More services -- When there is a wider choice of services on the community system, there is more opportunity to use more services. This is in part, what makes open service provider networks financially sound investments for communities: Open systems create a bigger market for telecom services, and thereby creates more revenue flowing through a community revenue sharing plan.
- More redundancy and resiliency -- In both the public and private sector, Internet access has become a critical core service. Businesses are now asking for diverse path routing (more than one fiber route locally and into/out of a region) when considering relocation. And many businesses are now purchasing a additional Internet feed from a second provider, who is, ideally, on a physically separate network in the community.
Ownership and Management

There are a variety of ownership and governance options for the locally controlled, independent private sector entity that will own and manage the network (Bozeman Fiber). This section outlines one approach that seems particularly appropriate for the Bozeman area. The intention would be to operate Bozeman Fiber as an open access network, meaning businesses and residents would purchase services from private sector providers.

Bozeman Fiber would not offer retail Internet, phone, and related broadband services and would not compete directly with local providers. Incumbent providers and competitive providers in the Bozeman area would all be invited to use the network to lower their cost of delivering high performance fiber services in the city.

In this model, BF owns most of the passive and active network assets. Additionally, BF operates the network as an open access, multi-provider, multi-service network and would welcome any and all service providers to use capacity on the network to deliver their services to their own customers.
Some passive assets like conduit and handholes could be built and owned by the City of Bozeman and leased to BF and/or other providers in return for recurring lease payments.

Bozeman Fiber would have several essential roles:

▶ **Contract Management** - BF would hold contracts for outsourced network operations, outsourced network repairs and maintenance, outsourced construction of network extensions, and service provider contracts for the services offered on the network. Where it is efficient and effective, BF would seek to use qualified private sector firms to handle the technical operations of the network to minimize the number of staff required by BF.

▶ **Financial Management** - BF would provide the financial oversight of the network. Most routine bookkeeping and accounting would not require full time staff and could be handled by BF staff and/or outsourced to a local accounting firm.

▶ **Marketing and Public Awareness** - BF would have to maintain an ongoing public awareness campaign to ensure that local businesses are aware of the opportunity to obtain higher performance, redundant and reliable fiber-delivered services at attractive (lower) rates. While service providers would be responsible for their own sales, billing and customer management, BF would focus on name and brand awareness in the community.

Bozeman Fiber, as a private sector enterprise acting on behalf of the community, keeps the local government out of the business of telecommunications services. The City role would be limited to building passive infrastructure (conduit, handholes) for City and County government, Kas school uses (SCADA controls, smart street lighting, energy management, public safety) and making any excess capacity available to the private sector.
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The telecommunications business is continually evolving. We have made our best effort to apply our experience and knowledge to the business and technical information contained herein. We believe the data we have presented at this point in time to be accurate and to be representative of the current state of the telecommunications industry. Market changes and new technology breakthroughs may affect our recommendations over time.

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Overview

INTRODUCTION

A market research study was conducted to determine the demand for expanded and improved options for Internet services in Bozeman. The survey was available online to businesses in the Bozeman area.

Questions in the survey were chosen to learn more about responding businesses in the following categories:

- Satisfaction with current telephone, Internet/data, and TV service
- Information about existing establishments and their employees
- Types of Internet connections at each establishment
- Current Internet usage and purpose
- Importance of Internet technology for the future of the organization
- Existing provider price and speed
- Satisfaction with current provider
- Services desired
- Information about the proportion of professionals who work from home

Surveys like this one are critical in determining the interest and demands of the targeted communities for the services offered. This research will provide the City (the City of Bozeman government) with a better understanding of the market potential, the demand for more affordable broadband, and more information about the customer base. Most importantly, market research data provides a basis for taking action to improve telecommunication services in Bozeman. The survey results could also give Bozeman an edge when pursuing state and Federal funding and grant opportunities.

METHODOLOGY

A survey of businesses in Bozeman, Montana was conducted online, and promoted through the Bozeman Area Chamber of Commerce, the Downtown Bozeman Partnership, the Prospera Business Network, the City of Bozeman, and local media. The respondents were asked a series of questions relating to their computer and Internet usage, service providers, need for services, and demographics.

The survey was developed by Design Nine using information supplied by survey professionals and feedback from the City of Bozeman.

Design Nine conducted pre-testing and validation of the questions. The survey was conducted over an one month period. One hundred forty two (142) surveys were completed.
Survey Methods—The survey was conducted through an online survey, open to any business who wanted to respond. This method was chosen due to several advantages, including faster results, lower costs, and a shorter data collection period.

Quality Control—Quality control measures cover many facets of the survey process, ranging from the type of questions asked to the type of verifications that are used on the data. The questions were constructed in a manner to limit the amount of response bias. We apply a number of different techniques at various steps of the project to ensure that the collected data is the best possible.

SUMMARY OF RESULTS

The Internet has become increasingly widespread in our society and for good reason. In order to support a high demand for Internet, the infrastructure must be in place. High capacity networks are seen as strategic infrastructure that serves as the catalyst for sustainable economic growth.

63% of respondents are not satisfied with their services.

28% of respondents answered that they needed better telephone service.

79% of respondents answered that they needed better Internet/data service.

Not counting MSU, Deaconess Health Services, the City, and the public schools, the average number of employees among the respondents is 16.4. There are 12 establishments with over 50 employees among these. With all employers counted the average is approximately 66 employees per business.

All respondents stated that they had an Internet connection.

65% of respondents have access through DSL and Cable, while only 9% have access through fiber.

48% of respondents generally pay between $41 to $100 per month for Internet access. Another 27% pay between $101 and $300.

Connection speeds are distributed fairly evenly between 1.5 and 50Mbps. Many respondents have a 3-5Mb, a 5-10Mb, or a 10-25Mb service.

Only 6% of respondents answered they were “very satisfied” with the current speed of their Internet service. 31% of respondents replied that they were “not at all satisfied” with the current speed of their Internet service.

Respondents generally use the Internet for communication via email, access to news and current events, research, ordering and managing inventory, and maintenance of a web presence via a blog or other site.

48% use the Internet to connect to remote sites.

74% of respondents indicated that they would be somewhat or very willing to pay more for faster, higher quality Internet access.
87% of respondents indicated that they found Internet technology to be a very important factor in the success of their company over the next five years.

About half of respondents answered that finding personnel with the needed computer, software, and Internet skills to be somewhat difficult or very difficult.

90% of respondents indicated that an affordable broadband Internet connection would be beneficial to their organization.

CenturyLink and Charter are the most common ISPs in the area. The survey results highlighted several other smaller providers as a competitive option to the two top companies.

31% of respondents are already saying they need a redundant path to the Internet.

85% of respondents say they need some kind of access from home.

**CUSTOMER SATISFACTION**

The survey responses show a large gap between business satisfaction with TV and Phone, and business satisfaction with their Internet connection. 28% of the respondents desired better telephone service and 79% of the respondents desired better Internet/data service. One in five respondents were satisfied with all of their services. This data indicates that businesses generally want to see better Internet options in Bozeman. This was an open-ended question.
BUSINESSES AND EMPLOYEE USAGE

100% of the businesses that responded to the survey indicated that an Internet connection existed at the establishment. Five major employers - the City of Bozeman, MSU, Bozeman Deaconess Health Services, Bozeman School District, and Belgrade Public Schools collectively have about 7,100 employees and approximately 31,000 computer users. Among the remaining 136 responses businesses have 16.4 employees, and 14.8 computer users on average.

A wide variety of establishments responded to the survey, which include professionals in the fields of education, retail, medical, non-profits, manufacturing, construction, farming, religion, tourism, and many more. Professional services, other categories, and retail establishments make up the majority of responses.

INTERNET CONNECTION TYPE, PRICE, AND SPEED

DSL and Cable account for 65% of the responses, with CenturyLink and Charter being the top two ISPs. The results show that there are some active smaller providers in the area offering competitive services. The largest proportion of respondents paid generally $41 to $100 for Internet access each month. 31% of the respondents were “not at all satisfied” with the current speed of their Internet service, while only 6% were “very satisfied” with their current speed.

Respondents were asked how they currently used the Internet to serve their needs at their respective establishments. The most common uses of the Internet were for communication via email, access to news and current events, research, and ordering and managing inventory. 48% of respondents use the Internet for point to point connections between their headquarters and remote sites.

74% of respondents are somewhat or very willing to pay more for faster, higher quality Internet access.

INTERNET TECHNOLOGY IMPACT TODAY

Respondents of the 142 business establishments overwhelmingly found Internet technology to be an important factor in the success of their company in the next five years. Only 1% found Internet technology to be “not important.”

Responses regarding the access to “tech skilled” employees was much better than other areas of the country, but 51% of the respondents still said it was somewhat or very difficult to find personnel with the needed computer, software, and Internet skills in the local area. A similar response was heard for access to training for employees.

90% of the respondents indicated that their organization would benefit from an affordable broadband Internet connection.

SERVICES DESIRED

Respondents were asked if there were other desired telecommunication needs not covered in the survey. This was an open ended question. Respondents commonly mentioned cell coverage, uptime and quality of service, and lack of availability of services. Responses are listed in the detailed results section of this report.
**Detailed Results**

The Internet has become increasingly widespread in our society and for good reason. In order to support a high demand for Internet, the infrastructure must be in place. High capacity networks are seen as strategic infrastructure that serves as the catalyst for sustainable economic growth.

**Level of Need**

We asked Bozeman businesses to describe their level of need when it comes to the Internet and other services. Approximately four out of five businesses say they need better Internet.

**Check items you agree with below:**

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need better telephone service</td>
<td>28%</td>
<td>58%</td>
</tr>
<tr>
<td>I need better Internet / data service</td>
<td>79%</td>
<td>19%</td>
</tr>
<tr>
<td>I need better TV service</td>
<td>18%</td>
<td>66%</td>
</tr>
<tr>
<td>I am satisfied with all my services</td>
<td>20%</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Check items you agree with below:**

[Bar chart showing the percentages for each item]
BUSINESS DETAILS

The information below paints a clearer picture of the business landscape in Bozeman. Bozeman businesses responded with their size, computer users, and their organizational activities.

We asked Bozeman businesses how many employees they had at their facility. Several major employers responded and are listed below:

- Montana State University responded that they have 4000 employees and 20,000 computer users.
- Bozeman Deaconess Health Services responded that they have 1800 employees and 1,300 computer users.
- Bozeman School District 7 responded that they have 850 employees and 7,000 computer users.
- Belgrade Public Schools responded that they have 450 employees and 3,500 computer users.
- The City of Bozeman responded that they have 400 employees and 450 computer users.

These five businesses/institutions are major consumers of broadband services and should be considered in any strategic planning done by the City of Bozeman. To give a better picture of the overall business profile we have omitted their response from the next two questions.

Number of Employees:

<table>
<thead>
<tr>
<th></th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Employees</td>
<td>2224.5</td>
</tr>
<tr>
<td>Average Employees per Establishment</td>
<td>16.35</td>
</tr>
<tr>
<td>Establishments with over 50 Employees</td>
<td>12</td>
</tr>
<tr>
<td>Number of responses</td>
<td>136</td>
</tr>
</tbody>
</table>

Number of Computer Users:

<table>
<thead>
<tr>
<th></th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Computer Users</td>
<td>2012.5</td>
</tr>
<tr>
<td>Average Number of Computer Users</td>
<td>14.79</td>
</tr>
<tr>
<td>Establishments with Over 50 Computer Users</td>
<td>12</td>
</tr>
<tr>
<td>Number of responses</td>
<td>136</td>
</tr>
</tbody>
</table>
"Type of organizational activities conducted at this facility:"

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>27</td>
</tr>
<tr>
<td>Professional</td>
<td>45</td>
</tr>
<tr>
<td>Government</td>
<td>1</td>
</tr>
<tr>
<td>Educational</td>
<td>10</td>
</tr>
<tr>
<td>Medical</td>
<td>4</td>
</tr>
<tr>
<td>Non Profit</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>42</td>
</tr>
</tbody>
</table>

**Type of Organizational Activity**

- **Retail** 19%
- **Professional** 32%
- **Government** 1%
- **Medical** 7%
- **Educational** 3%
- **Non Profit** 9%
- **Other** 30%

If other, what type:

- Agricultural Based Co-op
- Air-medical transport.
- Also contract work.
- Architecture, Art and Education
Art education, salon services
Business Service - Printing, Marketing and Direct-Mailing
Communications
Construction
Consultant, writer, co-author, editor
Design and architecture
Design, Manufacturing, and distributing sewn products
E-commerce
Engineering and manufacturing
Financial
Financial services
General Contractor, Construction
Graphic Design and web development.
Hope & the Holidays non-profit
Hospitality
Hotel
I am a freelance writer and editor. I do a lot of online research and I need the fastest
Internet connection possible or else I lose money on every project. I also provide
marketing consulting and social media management.
Investment Management
Investment quality art.
Investments
IT
Manufacturer
Manufacturing
Manufacturing
Manufacturing -- photonics components
Manufacturing & Machine Vision
Manufacturing and design
Marketing and advertising
Marketing and Printing
Medical aesthetic (medical and professional) AND Retail
My office is home base. My husband works from home too. I use cell phone only with
Verizon. He uses a land line and cell phone. We both use computers for personal and
for business. My employees do not use computer in home office. One uses a computer
at a remote location.
Online retail
Personal Home Assistance
Professional and residential
Professional, Engineering, Manufacturing
Real Estate
Recipe development, writing, consulting
Restaurant/Bar
RV or Camper Rental
Service
Service
Shipping platform
Software
Software development
Virtual Office including VOIP service
Wholesale Distribution

CONNECTIVITY
The results show that all respondents have an Internet connection at their business.

Does your organization have an Internet connection:

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>142</td>
<td>0</td>
</tr>
</tbody>
</table>

99%

If yes, what type:

<table>
<thead>
<tr>
<th>Type</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial-up</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Cable Modern</td>
<td>51</td>
<td>36%</td>
</tr>
<tr>
<td>Satellite</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>DSL Line</td>
<td>42</td>
<td>29%</td>
</tr>
<tr>
<td>T1 Line</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>Fiber</td>
<td>13</td>
<td>9%</td>
</tr>
<tr>
<td>Wireless</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3%</td>
</tr>
</tbody>
</table>
How much do you pay now for Internet access each month:

<table>
<thead>
<tr>
<th>Connection Type</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 - $20</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>$21 - $40</td>
<td>14</td>
<td>10%</td>
</tr>
<tr>
<td>$41 - $60</td>
<td>40</td>
<td>28%</td>
</tr>
<tr>
<td>$61 - $100</td>
<td>29</td>
<td>20%</td>
</tr>
<tr>
<td>$101 - $150</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>$151 - $300</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>$301 - $500</td>
<td>7</td>
<td>5%</td>
</tr>
<tr>
<td>$501 - $1000</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>$1001 - $1500</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>$1500+</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>
### Speed of your Internet Connection:

<table>
<thead>
<tr>
<th>Speed Range</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 - 256k</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>256k - 512k</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>512k - 1Mb</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>1 - 1.5Mb</td>
<td>14</td>
<td>10%</td>
</tr>
<tr>
<td>1.5 - 3Mb</td>
<td>11</td>
<td>8%</td>
</tr>
<tr>
<td>3 - 5 Mb</td>
<td>24</td>
<td>17%</td>
</tr>
<tr>
<td>5 - 10Mb</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>10 - 25Mb</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td>25 - 50Mb</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>50 - 100Mb</td>
<td>7</td>
<td>5%</td>
</tr>
<tr>
<td>100+ Mb</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>More than 1 Gigabit</td>
<td>2</td>
<td>1%</td>
</tr>
</tbody>
</table>

#### Connection Speed

![Connection Speed Chart](chart.png)
**CUSTOMER SATISFACTION**

How satisfied are you with the speed of your current Internet service

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all satisfied</td>
<td>44</td>
<td>31%</td>
</tr>
<tr>
<td>Somewhat Satisfied</td>
<td>66</td>
<td>46%</td>
</tr>
<tr>
<td>Satisfied</td>
<td>25</td>
<td>17%</td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>8</td>
<td>6%</td>
</tr>
</tbody>
</table>

How satisfied are you with the speed of your current Internet service

Check all items you use the Internet for now:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>141</td>
<td>99%</td>
</tr>
<tr>
<td>Access news and current events</td>
<td>120</td>
<td>84%</td>
</tr>
<tr>
<td>Download or listen to music online</td>
<td>82</td>
<td>57%</td>
</tr>
<tr>
<td>VoIP (Vonage, Skype, etc)</td>
<td>65</td>
<td>45%</td>
</tr>
<tr>
<td>Online Backup (files, photos, music)</td>
<td>105</td>
<td>73%</td>
</tr>
<tr>
<td>Transfer large files</td>
<td>102</td>
<td>71%</td>
</tr>
<tr>
<td>Service</td>
<td>TOTAL</td>
<td>PERCENTAGE</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Monitor / control security, alarms, health, processes, etc</td>
<td>41</td>
<td>29%</td>
</tr>
<tr>
<td>Telemedicine, telehealth</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>Communication between headquarters and remote sites</td>
<td>69</td>
<td>48%</td>
</tr>
<tr>
<td>Processing credit card / debit card transactions</td>
<td>66</td>
<td>46%</td>
</tr>
<tr>
<td>Research</td>
<td>95</td>
<td>66%</td>
</tr>
<tr>
<td>Ordering / managing inventory</td>
<td>79</td>
<td>55%</td>
</tr>
<tr>
<td>Maintaining a web presence with a blog or other site</td>
<td>108</td>
<td>76%</td>
</tr>
<tr>
<td>Allowing and processing online orders</td>
<td>54</td>
<td>38%</td>
</tr>
<tr>
<td>Education / distance learning</td>
<td>71</td>
<td>50%</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>16%</td>
</tr>
</tbody>
</table>

**If other, what type:**

- Bookkeeping, processing payroll
- Business operating software is cloud service
- Cloud based customer management program
- Cloud based patient charts and imaging
- Employees working remotely from home and connecting to office workstation, employees working on client's computer remotely from office, online SAAS (QuickBooks online), downloading large software programs
- Financial Transactions and Investment Analysis
- "Hosted " "cloud computing" "utilizing a remote desktop connection"
- I manage social media for clients, as well as other marketing services that require Internet access.
- I offer online auctions, so I manage auction online.
- Managing large video files. Uploading and online editing.
- Not using for my business right now....planning how to re-establish my business that has not been active since 2008. I have a business license and have not had income for several years from the business but that will change and I will be ready for the change - my clients will be in contact with me through email and phone. Many clients in the past from out of state and elsewhere besides Bozeman in Montana. There is only me as teacher/owner - no employees.
- Office 365 for email and collaboration.
- Online monitoring of remote imaging installations.
Online product platform
Photo uploads to other servers
POS (Point Of Sale)
Remote network administration for clients
Use CAD tools on a remote computer
Using two electronic medical health records' services!
Video conference facility
Video conferencing
Video streaming
Video streaming

Would you be willing to pay more for faster, higher quality Internet access:

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all willing</td>
<td>25</td>
<td>17%</td>
</tr>
<tr>
<td>Somewhat willing</td>
<td>72</td>
<td>50%</td>
</tr>
<tr>
<td>Very willing</td>
<td>35</td>
<td>24%</td>
</tr>
<tr>
<td>Not sure</td>
<td>11</td>
<td>8%</td>
</tr>
</tbody>
</table>

Willing to pay more for better Internet

- **Very willing**: 24%
- **Somewhat willing**: 50%
- **Not at all willing**: 17%
- **Not sure**: 8%

How important do you think Internet technology will be for the success of your company over the next five years:
## Local Skills and Availability

How difficult is it to find personnel with the needed computer, software, and Internet skills from the local area:

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>Somewhat difficult</td>
<td>55</td>
<td>38%</td>
</tr>
<tr>
<td>Not difficult</td>
<td>61</td>
<td>43%</td>
</tr>
</tbody>
</table>

---
How difficult is it to find and provide the appropriate training for employees in computer, software and Internet applications:

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Somewhat difficult</td>
<td>56</td>
<td>39%</td>
</tr>
<tr>
<td>Not difficult</td>
<td>65</td>
<td>45%</td>
</tr>
</tbody>
</table>

**Benefit**

Do you believe your organization would benefit from an affordable broadband Internet connection:

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>128</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td>10%</td>
</tr>
</tbody>
</table>

If yes, briefly state what is affordable and at what speed:

- If yes, briefly state what is affordable and at what speed
- Less than $120/month for up to 15mbps
- More than 100
- 1Mb/s for $200.00
- $100 for 100+ Mb
- $100 for 100 mbps symmetrical connection
- $100.00 to $150.00
- As fast as what is currently out there
- $100/mo for greater than 50Mb would be acceptable. We would be willing to pay more for higher speed (100Mb to 1G)
- $120 to $150 per month at 60 to 80 mb
- $200 50MB Down 20MB up 99.999% Uptime
- $200/month 1 GB
- $250 for 100MB-$500 for 1GB
- $49 @100 mb
- $50-$100 with 100mbps
- $50-60/month
Starting at $50/month. As fast as technology permits. The companies building the Internet transmission network and profiting from it are one and the same. They should be proud to provide the best service possible.

$500/month for fiber
$65 which is what I pay now. $50.00 seems better. Whatever the fastest is: 20MB?
$75/month
1 Gigabit @ $70 (Google Fiber pricing)
10 GB, $150 per month
10 MB would be sufficient for our remote locations in town. 20 MB is necessary for our main location. I would consider business service of 10 MB for less than $600/month to be affordable.
100 dollars per month at a guaranteed 20 Mbps down and 10 Mbps up.
100 mbps upload and download minimum. 1 gbps would be much better. We're willing to pay up to $120/mo. for this service.
100+ MB in the $150 - $200 range.
100Mbps @ $100
100Mbps for $100-$150/month or Gigabit for < $1000/month
20 mb/sec up/down for less than $200/month
30-50 up/down, <$100/month
40-80mb for under $1000/month after Erate
50 mb
50-100 mb for less than $50 per month per line of service
50-100mb at less than $100
50Mbp
Affordable means not much over $25.00 per month. Speed 52.0 and greater would be best at consistent levels.
Affordable would be less than $100/month. I'm in support of using fiber for Internet because of my customers' need for better service. What is good for customers is ultimately good for me.
Already have (extremely) high speed. More affordable is always nice.
Although the cost of ~$100 a month I feel is reasonable for broadband service, speeds of at least 30Mbps would be what I feel should be available at that price point.
Anything would be better than Charter. We frequently lose our phone and Internet connections. We've had the worst service in the past three months. Its frustrating trying to conduct business when service is down.
As fast and as steady as possible
As fast as possible and would be willing to pay the market price for reliable service.
Below $150/month seems reasonable for as fast as we can possibly get. We are using our Internet connection for everything from office duties, running a website, programming machines, shipping, research, and more and more it is becoming a benefit.
to employees who are completing menial duties and like to have music to listen to at work.

► Can't tell you for sure, but it's worth at least 50-100 bucks more than I'm spending now

► Close to current rate at faster than current speed

► Currently paying $60/mo and if the service would consistently live up to their advertised speeds of 20mbps, that would be okay. But it often slows down or even goes completely down. Would probably pay $75 for actual speeds reliably closer to 20mbps

► Currently, the only option we have is Century Link, which is an impossible company to deal with and we have had nothing but trouble from day one!

► Don't know...

► For what we're paying now, $390/month I'd like to see 20-40Mbps.

► Google's Gigabit Internet for $70

► I am happy with the speed that I get though my provider, but would like to pay less for it.

► I am not knowledgable of the cost for fiber service, but I would be 25% more than I am currently paying for Charter. I'm also very interested in VoIP.

► I am not the IT expert but I do pay the bills. I would think $50/month is reasonable based on my investigation. The fiber optic cable comes through our front yard but not able to connect. Not sure what that is all about.

► I currently spend about $60 for the fastest service Centurylink offers in our area. That seems like way too much for such slow service.

► I do not know and I am not sure about the price and speed that I have entered ahead. Paid by my husband employer. He is not here just now to give me this info. I answered randomly.

► The main issue is that at times it stops and comes back a few days after. This is a critical issue to run a business. Nerve wrecking and I am in town. I would not move outside of town. Can't even imagine!!

► I don't know the answer to that question, but with our reliance on EMRs for all patient charts and information, including billing, I believe we should have better access than what we are currently paying for!!!

► I think we'd be willing to spend around $100 per month for a 1GB connection

► I would either like to pay less for my current speeds OR get higher speeds for what my company is paying. Looking for a better value.

► I would gladly pay what I am paying now and perhaps as much as $200.00/Mo

► I would pay up to $300 a month for 25-30 mb up and down.

► I would pay up to $75/month for at least 20mbps

► I would say $40-60/mo. It would be nice to have the speeds that the Google Fiber cities have.
I wouldn’t want to pay more than I am currently paying for phone + Internet which is $100/month. I’d obviously like to pay even less than that since it is one of my bigger monthly bills.

I’d like to see a minimum of 10Mbps for under $100/mo.

I’m not actually sure what our current speed is. Just guessing above. But sometimes I have trouble with larger files and web conferencing. I think we pay over $100/mo for both Internet and TV right now, which seems steep. I’d be interested in better Internet for $50-70/mo.

Institutionally, 100GB, annual price point of >$100K including physical fiber paths, etc.

modestly more than what we currently pay to achieve 50 to 75 mg

More symmetrical, i.e., faster upload speed, for the same cost.

no more than $30

No more than $50/month for 10MB up and down and not more than $100/month for 15MB up and down

Not more than $50 per month would be affordable for me (preferably less) because I am a very small business and my revenue stream is sporadic. I would want a minimum of 30 mbps, I think. Not an expert, but from what I’ve read, that would be fast enough for what I do and, apparently, is readily available despite what current service providers claim.

Our biggest issue is poor upload speeds in the Downtown area and asynchronous service. Our server is in our Downtown store and all the traffic to our west main location has to then upload out of the downtown store. It makes using in store software in the remote location cumbersome at times. We currently have Fiber service at our West Main location and would be willing to pay similar amounts for similar synchronous speeds in the Downtown location. We pay about $400/month for 30/30 service.

Our current connection speed is very erratic. I would be willing to pay more for a consistent connection. There are not many options available. Either low end or very fast. Charter now has only one offering (we are grandfathered in with our plan), which I do not think that all people need.

Our main issue lies with upload speeds...our download speeds are fine. If the upload speed could be improved noticeably, paying 30% more would be reasonable

Rates should not rise for Montana, specifically the Montana area to come in line with the rest of the nation.

Satisfied with our current T1 speed.

Similar price as above ($65-ish) for 20+MB. Honestly if you can do it with any kind of customer service and consistent connection you have our business. Charter is fine until things stop working. Actually having to interact with them is a nightmare.

Speed is more important than the cost. The key is increased productivity.

Speed is ultimately most important, but in outlying areas (just down Sourdough) you can get only DSL through the phone company or satellite. It’s not inexpensive
The "posted" speed isn't the issue, the actual speed received at our site and the instability are a major problem. We utilize a cloud-based customer interface, and are often hampered due to slow connection speeds and interruptions in service.

To be affordable means to beat cable pricing. Although most think it may be faster because it can be DSL and broadband "'pool'" meaning many users on the same line where DSL is a dedicated line that only you can access, the more users on broadband or DSL leads to slower speeds and I think people don't understand that concept.

Under $400 - T-1 line or Fiber Access

Unsure

Unsure of current costs, as I'm not the financial/decision-maker for IT.

We would be interested in higher speeds than current, as we move to more education/training done over Skype/similar platforms.

Up to $100/month

Up to $60/month for faster than I have now (4mbps upload, up 30 30mbps download, I think)

We are looking for a solution such as Charter's Business Internet at 30Mbps or greater. We are in the Technology Park at College and 19th. We cannot get Charter's service into this park.

We are willing to pay any amount for reliable Internet, as fast as possible.

We could use 100 mb. Would like to get it in the $100-$150 range.

We could use a better WAN that could connect 12 locations at 1 gig up to 20 gig in future

We currently have a T-1 line, as it allows our security systems to run through our corporate headquarters in Nashville. We would need to coordinate with them to determine if any changes are possible.

We currently pay in excess of 40 dollars per mg - THis is almost twice the cost compared to services in larger metro areas. We will be tripling our needs in the next year with out any options for a more affordable solution.

We currently pay roughly $200/month for Internet. If we could have faster service that would be worth another $100/mo.

We need more choices for high speed Internet in Bozeman. Charter has not always been 100% reliable.

We need upload and download speeds of 5 and 15 if possible.

We pay for 30 mg but rarely get it. The current cable Internet speed goes up and down from 3mg to 30 mg. it is hard to do business when you have inconsistent speeds causing the wireless router to malfunction. Because we are a nonprofit and need the Internet to do business we require affordable Internet access without a balloon payment automatically instated after a year.

We want FIBER!!! The number of Bozeman startups and already established companies that would benefit from fiber is astronomical.

We would like to get up to 10-25 Mb for around $100/month
"We would like to pay around $100.00 for faster speed. Currently we have Line 1: 3mg down, 640 K up
Line 2: 1.5 mg down, 1.5 K up. Blackfoot could provide us with the following however they are much more expensive. DSL line for Fire Alarm: 2 mg up, 1 mg down
Office wireless: 3 mg up x 2 mg down
When I lived out of Bozeman in the Gateway area I was able to get a 100mb fiber line to my home for $50 per month through Montana Opticom. Since moving closer to Bozeman I only have Charter which is the same price but barely a quarter the speed.
Working all the time, money not issue
Would just like some more options, seems charter is the only real option for broadband at least where we are located. Would be nice if they had some competition so that the pricing was better.

TOP PROVIDERS
We asked Bozeman businesses who is your Internet service provider. The results show Charter and CenturyLink being the two top providers in the area, and identified a relatively large number of smaller providers.

Who is your Internet service provider:

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackfoot</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>CenturyLink</td>
<td>31</td>
<td>22%</td>
</tr>
<tr>
<td>Charter</td>
<td>56</td>
<td>39%</td>
</tr>
<tr>
<td>Integra</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>Little Apple</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>Montana Opticom</td>
<td>8</td>
<td>6%</td>
</tr>
<tr>
<td>Other / No response</td>
<td>28</td>
<td>20%</td>
</tr>
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</table>

Who is your cable/satellite TV provider:

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charter</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td>Direct TV</td>
<td>11</td>
<td>8%</td>
</tr>
<tr>
<td>Dish Network</td>
<td>7</td>
<td>5%</td>
</tr>
<tr>
<td>Opticom</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>PERCENTAGE</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>&quot;None&quot; or &quot;N/A&quot;</td>
<td>59</td>
<td>41%</td>
</tr>
<tr>
<td>Other or No Response</td>
<td>36</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Who is your local dial-tone telephone service provider:**

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CenturyLink</td>
<td>42</td>
<td>29%</td>
</tr>
<tr>
<td>Charter</td>
<td>32</td>
<td>22%</td>
</tr>
<tr>
<td>Integra</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>&quot;None&quot; or &quot;N/A&quot;</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>VoIP (various providers)</td>
<td>8</td>
<td>6%</td>
</tr>
<tr>
<td>Other or No Response</td>
<td>38</td>
<td>27%</td>
</tr>
</tbody>
</table>

**Who is your long-distance telephone service provider:**

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CenturyLink</td>
<td>35</td>
<td>24%</td>
</tr>
<tr>
<td>Charter</td>
<td>31</td>
<td>22%</td>
</tr>
<tr>
<td>Integra</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>&quot;None&quot; or &quot;N/A&quot;</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Verizon</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>VoIP (various providers)</td>
<td>7</td>
<td>5%</td>
</tr>
</tbody>
</table>

**INTERNET NEEDS**

What other telecommunication needs do you have that were not covered in this survey:

- 1Gbps between city buildings
"Hotel" space for remote workers in Bozeman.
Better WAN
Better wireless coverage and more robust wireless data coverage in high-traffic areas of Bozeman.
Cell phone
Cell phone wireless
Cell phone.
Cell phones and we are doing OK with that for now.
Cellphone
Don't know
I am not sure where this issue is applicable. We use a remote desktop connection to connect to our hosted company software. We run into connection troubles due to stability issues (packet loss) at both locations (warehouse and secondary office location).
I believe this "fiber ring" should extend to residents as well. Our tax dollars are going to pay for this, and we should benefit from it also. Currently offerings by DSL and Charter, do not live up to what they say. I usually never get more than half of the speed I pay for. If we (the city) is going to do this, let's do it right and bring the entire community up to world Internet standards, that would make us stand out even more. There are plenty of communities across the nation that have build municipal ISPs. It wouldn't even have to be maintained by the city, but rather an independent no-for-profit origination.
I don't see any other field for general notes, but the question of how difficult it is to find qualified personnel is not one I can answer as I am an IT consultant. I provide support, I don't need it. Since I have all the business I am interested in, I have no idea how much competition there is in the area.
It would be nice to have an option for a guaranteed uptime so I could host the website here, and have a reliable remote connection to our database. Not required as suggested in the next question, but it would improve our services and internal processes, which I would pay more for.
Just cell phone
More robust wi-fi
No other telecommunications, but I'm using this space to say that I did not understand the questions above about finding personnel with skills and finding appropriate training. These two questions seemed outside the context of this survey and I did not know how to answer them. What skills and what training? I did not understand what was being asked in those two questions, so I left them blank.
None, our only need at this time is faster Internet. We recently inquired with Charter for faster service and at this time they are not willing to run cable across the street for us to access. It is frustrating to hear that the service changes dramatically just by being on the wrong, or right, side of the street.
PRI would be nice but will likely end up getting a simulated one through our ISP.
Reliable, fast credit card processing
See above

Should there be a conversation around what is available in the cellular connection world from the likes of Verizon (current back up connection option); should there be a conversation around what infrastructure requirements might be needed to implement the next two versions of wifi AC? Great Internet service is important, but just as important is having that service executed as awesome wifi.

Site to site connections

TelePresence and other commercial video options

We not only need affordable Internet we also need more affordable and reliable private connections to our "remote" sites in the Bozeman area.

We will soon be relying on fast Internet upload/download speeds to communicate with our technicians in the field on their smart phones. The more we can do this reliably the more we save on cell data fees.

Wireless access in our building is spotty and unstable. Century link (in one of its previous incarnations) repeatedly told me that it had to do with it being an old building with lots of users in the area. I don't buy it. I want a company who will make sure their services work as advertised and don't give excuses or ever send a technician to diagnose and fix the problem.

Does your business require a redundant or alternative path to maintain a constant connection to the Internet:

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>31%</td>
<td></td>
<td>61%</td>
</tr>
</tbody>
</table>

Do you work from home:

85% of respondents are working from home.

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I work part time at home for another company</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>I work full time at home for another company</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>I need nights and weekends access for company business</td>
<td>63</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>PERCENTAGE</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>I am self employed and work part time</td>
<td>30</td>
<td>21%</td>
</tr>
<tr>
<td>from home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am self employed and work full time</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>from home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I never work from home</td>
<td>21</td>
<td>15%</td>
</tr>
</tbody>
</table>

Need access at home

- **Part time**: 21%
- **Nights and weekends**: 45%
- **Full time - Self**: 14%
- **Full time**: 3%
- **Never**: 2%