

**CITY OF ST. LOUIS PARK**  
ST. LOUIS PARK, MINNESOTA

**WIRELESS INTERNET SERVICE  
FEASIBILITY STUDY**

**SUMMARY REPORT**



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**APPENDICES**

- A. Public Process
- B. Municipal Role in Utilities

The Appendices are provided in the enclosed compact disk (CD).

In addition to the Summary Report, the Supplemental Report and Exhibits contain a more detailed analysis of our findings.



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## ACCOUNTANTS' COMPILATION REPORT

City Council  
City of St. Louis Park  
St. Louis Park, Minnesota

We have compiled the accompanying projected statements of operating income and cash flows and other schedules for the City of St. Louis Park proposed broadband services for the projected Years One – Five in accordance with standards established by the American Institute of Certified Public Accountants.

The projections used in this analysis and any accompanying studies were prepared to assist the City of St. Louis Park in assessing the financial feasibility of establishing a broadband utility to offer connectivity services to residents and businesses in St. Louis Park, Minnesota. The analysis includes projected operating revenues, expenses, and cash flows for the 5 year life of the system based on estimated construction costs and various market penetration rates. This analysis should not be used for any other purpose.

A compilation is limited to presenting, in the form of a projection, information that is the representation for management and does not include evaluation of the support for the assumptions underlying the projection (all assumptions were provided by and approved by the City). We have not examined the projection and, accordingly, do not express an opinion or any other form of assurance on the accompanying statement or assumptions. Furthermore, there will usually be differences between the projected and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. We have no responsibility to update this projection for events and circumstances occurring after the date of this projection.

This projection and any accompanying studies are intended solely for the information and use of the City of St. Louis Park Council and management, and are not intended to be, and should not be, used by anyone other than these specified parties.

Madison, Wisconsin  
September 12, 2005



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## ST. LOUIS PARK PUBLIC SERVICE BROADBAND BUSINESS PLAN SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

### **NATURE OF PROJECTION**

The financial projection presents, to the best of management's knowledge and belief, the City of St. Louis Park expected results of broadband utility operations for the projected period. Accordingly, the projection reflects its judgment as of September 12, 2005 of the expected conditions and its expected course of action. The assumptions disclosed herein are those that management believes are significant to the projection. There will usually be differences between the projected and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

### **NATURE OF OPERATIONS**

This study was prepared to assess the feasibility of establishing a broadband utility. If formed, the broadband utility should be a separate enterprise fund of the City of St. Louis Park. The broadband utility would account for the cost of operations on a continuing basis and be managed by the City of St. Louis Park. It would provide broadband services to properties within St. Louis Park, Minnesota and possibly the surrounding communities.

### **REVENUE RECOGNITION**

Revenues are recorded for service rendered based on number of subscribers.

### **EXPENSES**

Projected expenses are reported on the accrual basis.

### **CONSTRUCTION COSTS AND CAPITAL ADDITIONS**

Construction costs and capital additions are recorded at original cost, which includes material, labor and overhead costs.

### **DEPRECIATION**

Depreciation is computed using straight-line rates applied to the average plant balance. Fiber plant activities are depreciated over a 20 year life, whereas electronics and other equipment are depreciated over 5 years. A funded depreciation account (25% of total investment) is also established.

### **FUNDING**

This analysis uses capital leases and an internal loan as the financing sources for this project. It is assumed that no debt service reserve or capitalized interest reserve is required.

# Foreword

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The City of St. Louis Park, Minnesota (St. Louis Park) is considering offering broadband connectivity services to businesses and residences in the community. In order to assess the potential of this opportunity, St. Louis Park, in partnership with St. Louis Park Schools (Independent School District No. 283), contracted with Virchow, Krause & Company, LLP to investigate the financial and operational feasibility of entering into a broadband utility service.

This plan analyzes the possibility of St. Louis Park selling broadband services to the businesses and residences in St. Louis Park over a wireless network. The proposed network will also support new applications and general public services that enhance fire, police, and other public safety efforts.

## Connectivity in St. Louis Park

There are a variety of Internet options available from multiple providers. Dial-up services range from \$10 per month to \$25 per month. Non-promotional low-end high-speed options start at \$24.99<sup>1</sup>. Given this, why is St. Louis Park considering a high-speed Internet offering? The answer is both price and availability.

- The non-promotional subscription fees of high-speed services are a barrier to many households.
- While a variety of services are available, they are not available in all parts of St. Louis Park. Some residences may have a choice of multiple high-speed providers, while other residences have limited or no options.

In addition, the proposed network will enable St. Louis Park to support enhanced monitoring, security, and other public safety and public service applications.

## Municipal Involvement

The Internet has changed the way we teach, learn, conduct business and communicate. This transformation has just begun and as it continues to develop, the Internet will become less of a luxury and even more of an integral part of our lives. In order to ensure the development of the availability of high-speed Internet, municipal involvement is necessary.

- High-speed Internet is quickly becoming an essential service.
  - Many municipalities are positioned to offer an affordable option.
  - Municipals are positioned to price services that will maximize participation, rather than maximizing revenues.

The results of the market research and public input process indicate strong support for a City of St. Louis Park wireless Internet offering. The additional choice of a wireless offering provides the ability to encourage dial-up users to convert to high-speed, improve affordability for people in all income groups, facilitate enhanced public safety initiatives, and provide a platform for economic development efforts.

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<sup>1</sup> A 256 Kbps service. Priced at \$24.99 per month, but requires qualifying home telephone package. Also requires customer to lease customer premises equipment for \$5.00 per month. Qwest is currently also offering discounted packages for \$10 to \$20 less per month than standard packages for first 12 months of service. Discount is available to new DSL customers only and expires on October 8, 2005.

- The infrastructure required to deliver the high-speed offering can be leveraged by St. Louis Park.
  - The high-speed Internet infrastructure (fiber and wireless) will allow St. Louis Park to improve services and reduce costs.
  - The high-speed wireless Internet service helps St. Louis Park attract and retain residents and businesses, and compete more effectively with Minnesota’s other 800+ and the nation’s 18,000+ cities.
- Affordable high-speed access is an important tool for economic development.
  - Widespread availability of high-speed Internet addresses affordability concerns for small businesses, which are the businesses that create the majority of new jobs.

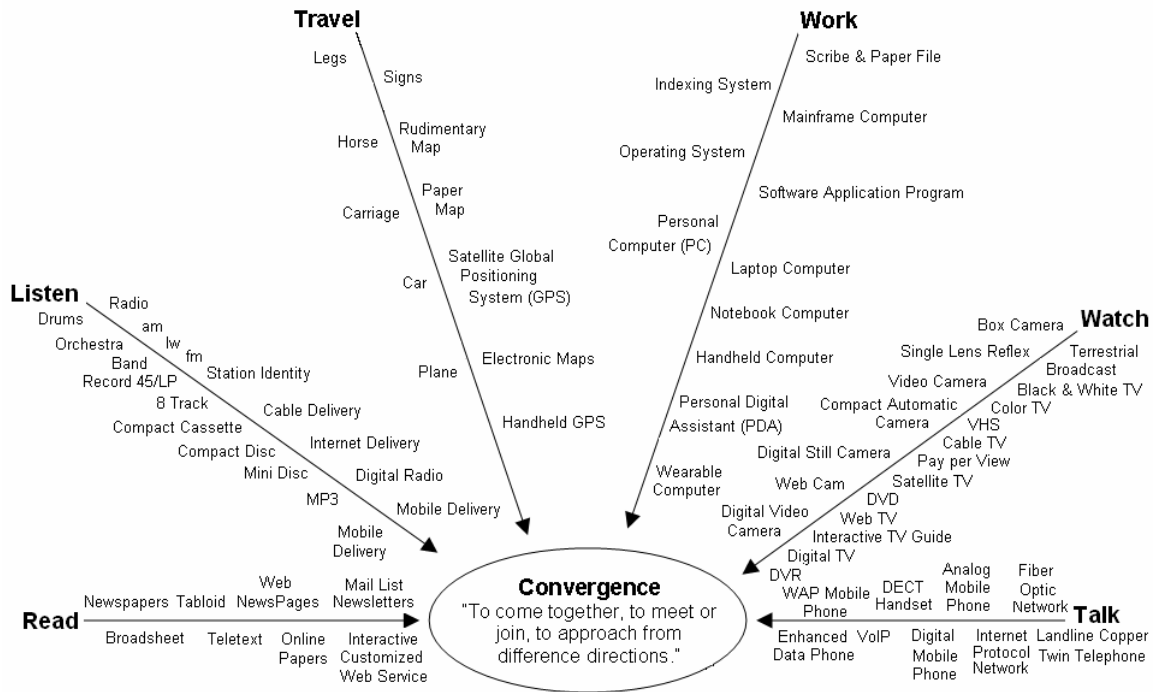
Another alternative for addressing the “affordability” of services is to provide funding for low-income households. However, the issue is not only “affordability.” Not all locations in St. Louis Park have access to a high-speed option.

As in any new business venture, there are risks. The risks are minimized, however, due to the benefits that this network may deliver to the City of St. Louis Park and other public agencies.

**Technology Convergence**

Technology convergence threatens the traditional telephone and cable television business models. Technology convergence, left unaffected by regulations, will separate the service from the infrastructure. In the future, voice and video services will become applications provided over a high-speed Internet connection. Traditional telephone service will converge towards Voice-over Internet Protocol (VoIP) and cable television service will converge towards Internet Protocol Television (IPTV).

Figure F.1 below a brief summary of the history of technologies leading up to the convergence of services.



**Figure F.1: History of Convergence**

Understanding and adapting to convergence is a critical part of St. Louis Park's connectivity plans.

### Objective

St. Louis Park seeks to enhance community development in the city by promoting the demand and affordability of high-speed and broadband data connectivity.

The city's visions to reach this objective include, but are not limited to, the following:

- St. Louis Park is a connected community, where all people have an equal opportunity to participate in civic affairs through all means possible, at all times possible, in all places possible.
- St. Louis Park is a place where community connections and the quality of life are enhanced by access to high-speed Internet access anywhere, at any time, by anyone.
- St. Louis Park is a community-wide Internet hot spot where all thrive civically and economically for a lifetime.

The goals to reach this objective include:

- Offer a high-speed alternative priced to compete with dial-up services.
  - Residential Market (under \$25 per month)
  - Small Business Market (under \$30 per month)
- Ensure that the broadband utility maintains a positive cash flow.
- Increase awareness of the benefits of high-speed access.

- Advance the region’s connectivity options and “most-wired city” efforts.
- Encourage new applications, such as telemedicine and distance learning.
- Enable applications and other public services to support expanded public safety initiatives (video monitoring, remote access, other).
- Recognize and support the benefits of high-speed mobile and portable connectivity via wireless technologies.

The desired position of the proposed St. Louis Park service is delivery of essential high-speed Internet services to residential and small business users. Additional visions and goals will be formed by the community’s current Vision St. Louis Park process.

# 1. Executive Summary

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## 1.1 Recommendations and Insights

We recommend that St. Louis Park consider pursuit of a wireless broadband offering to serve residences and small businesses. The projections indicate that it is possible for St. Louis Park to provide low-cost essential Internet service, enhance public safety applications, stimulate economic development, maintain a positive cash flow, and provide a reasonable return on investment.

- Public opinion through surveys conducted indicate that wireless high-speed Internet is in demand in the City of St. Louis Park.
  - High-speed Internet is quickly becoming an essential service.
  - High-speed Internet not only offers a choice of data connectivity, it also empowers consumers to have additional choices for voice and video applications.
- Through wise decision making, St. Louis Park has an infrastructure backbone fiber in place today with adequate capacity to support wireless broadband.
- The infrastructure required to deliver the high-speed offering can be leveraged by the Public Safety entities, such as the police and fire departments. The wireless infrastructure will also support other time and money saving applications to allow the City of St. Louis Park to stretch budget dollars and improve the level of service to its citizens.
- The wireless network addresses the spot coverage of high-speed alternatives today, and will allow St. Louis Park to provide affordable wireless internet access to all its citizens.
- The proposed offering addresses affordability concerns for small businesses,<sup>2</sup> the businesses that create the majority of new jobs. It will become an important asset for economic development within the community.
- The wireless network can be leveraged to promote free markets for innovative entrepreneurs.

Today's wireless technologies offer the ability to provide a low-cost, high-speed service that is comparable to DSL and cable modem services. A wireless offering provides the ability to encourage dial-up users to convert to high-speed, offer portability throughout the City of St. Louis Park, and provide the desired competition.

As in any new venture, there are risks. The risks are minimized; however, due to the benefits that this network will deliver to the City of St. Louis Park and other public entities.

## 1.2 Business Models and Financial Overview

### Business Models

We reviewed seven (7) potential business models for St. Louis Park's consideration.

- **Universal Access:** Provide free or subsidized service.

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<sup>2</sup> The proposed wireless offering is not tailored to larger businesses.

- **Economic Development:** Ensure that low-cost access is available to all residences and businesses.
- **City Operations:** Deploy network based upon public safety and other municipal applications.
- **ISP Competition:** Become a retail provider of high-speed connectivity services.
- **Public-Private Partnership:** Collaborate with existing or new providers to enhance services and reduce risks.
- **Open Access Model:** St. Louis Park deploys a wireless network that a retail provider can leverage to deliver services.
- **Private Enterprise:** St. Louis Park does not install a network, but promotes available services from incumbent providers.

The Federal Communications Commission (FCC), this August, ruled DSL as an information service. This ruling means that Qwest will no longer be required to lease DSL circuits to resellers such as Cascade Communication. This ruling makes both the DSL and cable modem infrastructure “closed” to resellers.

- Qwest claims that this ruling will encourage them to expand the availability of DSL.
- Critics claim this ruling will limit customer choice and increase access fees since the market will now be served by only two providers.

Our concern with the ruling is that individual providers may try to prevent new services such as VoIP and IPTV from being supported.

Through market and financial analysis, we concluded a combination of the Public-Private Partnership, Economic Development, and City Operations models best fits the City of St. Louis Parks’ needs:

- Enhance public safety efforts by leveraging the data transfer capabilities offered by the proposed wireless network (City Operations).
- Create a most “unwired” city campaign and promote ubiquitous availability of low-cost “portable” Internet Services (Economic Development).
- Install a wireless network and offer retail services to residences and small businesses (Public-Private Partnerships).
  - Contract out ISP hosting, help desk, and monitoring services.
    - + Going down the path of seeking a hosting partner may encourage an ISP to participate in a wholesale or open access contract.
  - Negotiate with an existing provider to obtain backhaul access to the Internet (Public-Private Partnerships).

Exit strategies and the business models are discussed further in Section 6 of the Supplemental Report.

#### **Private vs. Public Services.**

The City of Indianapolis Indiana “privatized” their water company a number of years ago. Since the privatization costs have stabilized, infrastructure improvements have been made, and quality of services has risen. Given this, why would St. Louis Park consider a wireless network? To answer, let’s look at what “privatization” was:

- First, the City of Indianapolis purchased the water company from a private business.
- Second, the City of Indianapolis invested in the infrastructure, making overdue upgrades and improvements
- Third, the City of Indianapolis developed Service Level Agreements (SLA's) and sought bids from private companies to manage the delivery of water services. The management contract has performance measurements which are monitored, and the contract is re-bid on a periodic basis.

In other words, “privatization” meant the City of Indianapolis taking control and ownership of the infrastructure and then allowing a private operator to manage the business that is regulated by the city.

## Financial Overview

Base case financial projections are shown in Table 1-1. The market share estimates are based upon the results of the market research. The projections assume a 5-year general obligation bond for the wireless and customer premises equipment, a 20-year bond for the fiber extensions, and a 5-year loan for retail operational expenses.

**Table 1-1: Base-Case Financial Projection**

Market <sup>1</sup> Share (by Year 5)		Capital Requirements <sup>2</sup> (\$000)	Fiber, Network and CPE <sup>3</sup> Costs		Cash Flow <sup>4</sup> Balances	
Residential %	Business %		Year 1 (\$000)	Total (\$000)	Year 1 (\$000)	Year 5 (\$000)
45	21	\$ 4,445	\$ 3,732	\$ 4,381	\$ 33	\$ 414

<sup>1</sup> Based upon market survey results (see Sections 3 and 8 for details).

<sup>2</sup> For implementation and initial operating expenses; includes a \$2,300,000 bond for network equipment and CPE, a \$1,400,000 bond for fiber, and a \$745,000 internal loan for operational expenses.

<sup>3</sup> Customer Premises Equipment.

<sup>4</sup> Since the fiber is financed over 20 years, the resulting IRR is negative.

Due to the propagation characteristics of a wireless network, large apartment complexes require additional fiber and network equipment in order to receive reliable service. We have assumed in the financial analysis that gateway fiber connections will be built directly to any apartment complex with between 90 and 300 units. Any apartment complex with greater than 300 units will require additional equipment, and must be dealt with on a case-by-case basis. These complexes are therefore not included in the financial analysis.

**The base-case financial projections shown in Table 1.1 do not include public safety and economic development benefits.** Further, the above figures were calculated using market shares taken directly from the residential surveys. However, these market shares are only estimates and revenues are sensitive to the percentage of market share captured. Table 1-2 displays cash flow at the end of years 1 and 5 at various levels of captured residential market share, and an example of the effect of considering public safety and economic development benefits. As seen, by considering potential public safety and economic development benefits, the break-even market share drops.

**Table 1-2: Market Share Sensitivity**

Market Share <sup>1</sup> (Customers)		Cash Flow Balances without Public Safety and Economic Development Benefits		Cash Flow Balances with Example Public Safety and Economic Development Benefits <sup>5</sup>
Residential	Business	Year 1	Year 5	
35% (5,482)	21% (297)	\$ (48,442)	\$(1,194,857)	\$(194,857)
<b>37%<sup>2</sup> (5,795)</b>	<b>21% (297)</b>	<b>\$ (31,783)</b>	<b>\$ (869,721)</b>	<b>130,279</b>
39% (6,109)	21% (297)	\$ (15,372)	\$ (545,234)	454,766
41% (6,422)	21% (297)	\$ 1,350	\$ (220,396)	779,604
<b>43%<sup>3</sup> (6,735)</b>	<b>21% (297)</b>	<b>\$ 17,676</b>	<b>\$ 104,827</b>	<b>1,104,827</b>
<b>45%<sup>4</sup> (7,048)</b>	<b>21% (297)</b>	<b>\$ 32,990</b>	<b>\$ 414,292</b>	<b>1,414,292</b>
47% (7,362)	21% (297)	\$ 50,808	\$ 777,393	1,777,393
49% (7,675)	21% (297)	\$ 67,236	\$ 1,114,863	2,114,863
51% (7,988)	21% (297)	\$ 83,856	\$ 1,452,973	2,452,973
53% (8,301)	21% (297)	\$ 100,284	\$ 1,790,316	2,790,316
55% (8,615)	21% (297)	\$ 116,988	\$ 2,128,160	3,128,160

<sup>1</sup> By the end of year 1.

<sup>2</sup> Approximate cash flow break-even point considering public safety and economic development benefits.

<sup>3</sup> Approximate cash flow break-even point.

<sup>4</sup> Base case.

<sup>5</sup> See Section 1.3 for additional information.

Section 8 of the supplemental report provides additional detail on the key assumptions and their sensitivity to the financial projections. Exhibit I provides detailed schedules of cash flows, income statements, and all assumptions.

Given the implementation, operating, and maintenance assumptions to maintain cash flow, we recommend that the City of St. Louis Park set a goal to obtain 45% of residential market share (36% of all households) and 21% of business market share (15% of all businesses). These percentages are the anticipated market share projections derived from market research (see Section 3 – Internet Market Assessment and Section 8 – Financial Projections of the supplemental report). Other key assumptions include:

- Customers have the option of either buying customer premises equipment for \$150 or leasing it for \$5.00 per month. We assume that half of customers will buy CPE and half will lease. Encouraging customers to buy CPE rather than lease it will help to shift cash flow to the beginning of the forecast period, when cash flow is likely to be lower.
- Standard<sup>3</sup> <sup>4</sup> Internet is offered at \$19.95 per month, plus wireless bridge (lease or purchase). (Please see Exhibit VI for more detail on potential service offerings.)

<sup>3</sup> Based upon GoMoorhead! offering: 1 Mbps (up and down), 5 email accounts, dynamic IP address, and allows for 2 active devices.

<sup>4</sup> The initial service offering is at 1 Mbps (up and down). This is expandable to 3 to 4 Mbps without hardware changes.

- Deluxe<sup>5 3</sup> Internet is offered at \$29.95 per month, plus wireless bridge (lease or purchase).
- 80% of residences and 30% of businesses will subscribe to the Standard Internet package, while 20% of residences and 70% of businesses will subscribe to the Deluxe Internet package.

From a cash flow perspective, the residential market is king. As seen in Table 1-3, about 95% of projected revenue is from the residential market.

**Table 1-3: Revenue Projection**

	Year 1	Year 5
Residential	\$ 1,088,783	\$ 2,307,860
Business	60,737	142,408
Total	<u>\$ 1,149,520</u>	<u>\$ 2,450,268</u>

This is not to say, however, that the business need is not important. **Service to the business market is extremely important from an economic development perspective and benefits.**

### Funding

We estimate that a 5 year bond/internal loan of \$2,300,000 and a 20 year bond/internal loan of \$1,400,000 are required to fund implementation costs. An additional \$745,000 internal loan is required to fund initial operation costs. Given that the Customer Premises Equipment (CPE) accounts for over 25% of the wireless implementation costs, the actual subscription rates will impact the financing requirements.

Other financing such as leasing and vendor underwriting was considered. However, given the status of the product development and market conditions, we feel these options will have few if any takers or require much higher rates than a GO bond.

### Sensitivity

Controlling costs is critical. Costs are amplified given the low-cost provider objective.

- A \$50,000 increase in annual operating expenses requires an additional 520 residential customers to maintain cash flow.
- A \$200,000 increase in capital requirements requires an additional 500 residential customers to maintain cash flow.

<sup>5</sup> Based upon GoMoorhead! offering: 1 Mbps (up and down), 10 email accounts, static IP address, and allows for 3 active devices.

### 1.3 Benefits and Costs Beyond the Balance Sheet

Obtaining ubiquitous wireless connectivity is a growing goal of many municipalities. At times, the connectivity goal is combined with the objective of lowering the cost of broadband access. Other times, it is not. Communities such as Corpus Christi, Texas and Providence, Rhode Island have implemented a wireless solution, not based upon subscriber revenues, but based on public service benefits and operational cost reductions. The City of St. Louis Park may realize benefits beyond the financial projections presented in this plan. A case might be made to implement the proposed wireless network based solely on internal benefits such as the following:

- Enable crews in vehicles or trucks to have access to the same information that is available in the office. Unlike mobile data terminals (slow connection), no special software applications need to be written or developed due to the speed of the wireless connection.
- Enable remote video security monitoring at water plants and other utility facilities.
- Enable remote video security monitoring of schoolyards, parks, and other locations in the coverage area.
- Enable citizens to view common areas equipped with video monitoring.
  - See if other children are at the park.
  - Check traffic or other conditions.
- Enable the City of St. Louis Park to expand city resources that are available online.
- Reduce the use of cellular telephones and other devices by the City of St. Louis Park staff by the support of Voice over Internet Protocol (VoIP) and other applications.

As indicated in Table 1-2, these benefits could easily exceed \$1,000,000 during the network's projected 5 year life.

#### Cost Sharing

The finances shown in Section 1.2 assume the broadband utility will pay 100% of the wireless network and the fiber extension<sup>6</sup> to connect the wireless gateways. **Given the public safety and economic development benefits, it is appropriate for other city departments to cover a portion of the implementation costs or make lease payments for capacity used.** For example:

- As noted previously, we estimate the public safety and economic development benefits of this network could exceed \$1,000,000. It is reasonable to consider financing all or part of the investment in fiber extensions with other general purpose city funds. The broadband utility would then lease the fiber to the wireless gateways from the city's general purpose-related operations (dark fiber only).
  - Increases end of year cash flow balances to:
    - + \$1,499,000 year 1
    - + \$1,898,000 year 5
  - Increases Internal Rate of Return (IRR) to 20.75%

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<sup>6</sup> We estimate 12 miles of fiber is required to connect the existing fiber backbone to the wireless gateways. See Section 5 for additional details.

- If Public Safety/Economic Development finances for 50% of wireless network (not including CPE costs)
  - Increases end of year cash flow balances to:
    - + \$962,000 year 1
    - + \$1,694,000 year 5
  - Increases IRR to 13.64%
- Combining the above, we
  - Increase end of year cash flow balances to
    - + \$2,428,000 year 1
    - + \$3,177,000 year 5
  - Increase projected IRR to 56.07%

### **Future Revenue Streams**

Additional revenues are also possible. For example, St. Louis Park may consider becoming a VoIP reseller. Being a reseller, St. Louis Park does not need to develop a VoIP application. For example:

- Norwood Municipal Lighting Plant, Norwood, MA, offers cable television and high-speed Internet in the community. Recently they expanded their offering by adding a \$20 per month VoIP service. Norwood sells the service and does the monthly billing, while VoIP provider maintains the VoIP application. Revenues are split equally between the firms.
- Coldwater Board of Public Utilities (CBPU) is a Vonage reseller. With this arrangement, the CBPU sells the initial service, but does not bill or maintain the customer. The CBPU obtains \$3 per month per customer for the initial sale.

In addition, we expect that an increasing number of applications will evolve that will advance revenue potential, public safety, and economic development activities.

### **Expansion of Service Area**

The City of St. Louis Park is positioned to expand the wireless network into the surrounding communities. The expansion, however, would take additional investment in fiber infrastructure and wireless access points. Given this, any expansion would need to be done in cooperation with the surrounding communities.

Depending on who St. Louis Park selects to provide web-hosting services, they may also be able to find alternative sources of revenue. For example, one of the service package options for the GoMoorhead! wireless service in Moorhead, MN is tailored towards students who leave the area for the summer or other Moorhead residents who may have winter homes in other locations. These subscribers can use the wireless network while they are in Moorhead, then are able to access the Internet via a dial-up connection for a reduced fee while they are out of town. The dial-up service uses an 800 number, so there are no long-distance charges.

## 1.4 Pilot Implementation

Prior to making a decision to proceed with a city-wide implementation, St. Louis Park may consider conducting a pilot implementation. Tasks to complete in a pilot implementation include:

- Conduct detailed wireless design
- Develop and issue an RFP for wireless equipment
  - Vendor selection based upon a successful pilot
- Refine public safety and public service applications, requirements, and benefits
- Obtain feedback from potential users
- Refine testing and implementation plan
- Confirm vendor selection

The pilot test area is to be selected based upon a balance of the availability of fiber and the type of customers in the area.

The recommended budget for the pilot implementation is \$250,000, which includes deployment of approximately 12 radio nodes (of which 2 are gateways) and a portion of the core switches and routers.

## 1.5 Health Considerations

### Health Concerns

During the July 2005 Public Forum, several citizens and other concerned individuals raised questions regarding WiFi's impact to public health. Further, it was stated that the Cities of Edina and Minnetonka had decided not to pursue WiFi due to health concerns. Following the meeting, we conducted a search for any studies or documentation on health concerns. We have included our findings in Exhibit I. Our findings indicate:

We have found no evidence of harmful health effects that would be introduced by the proposed WiFi network.

- The Minnesota Department of Health (MDH) has concluded that exposures to radiofrequency fields have been shown to cause thermal effects at high exposure levels; however, public exposure near cellular base stations<sup>7</sup> and antennas are well below current federal safety guidelines. In addition, the Minnesota Department of Health also concludes that there is limited evidence to suggest that radio frequency fields cause athermal effects (e.g., cancer).
- The Federal Communications Commission (FCC) states that at low levels<sup>8</sup> of exposure to radio frequency (RF) radiation the evidence for production of harmful biological effects is ambiguous and unproven.
- The decision by the cities of Edina and Minnetonka to not pursue WiFi was not related to health concerns. The decision was made due to market demand questions (Edina) and development costs concerns given the terrain (Minnetonka).

<sup>7</sup> Which have power levels greater than WiFi.

<sup>8</sup> The FCC/IEEE/ICNIRP Public Exposure Standard for frequencies between 800 and 2,200 MHz is 1 mW/cm<sup>2</sup>. Typically, measurements near a mobile phone base station yield under 0.001/mW/cm<sup>2</sup>. WiFi power levels are lower yet.

The evidence on health outcomes other than cancer, compiled from the *British Medical Association* (BMA-May 2001) and other reports, cited above may be summed up as follows:<sup>9</sup>

- **Reproductive System:** “Studies on rodents have not found convincing evidence of risks to the fetus or male fertility.”
- **Effects on the Eye:** “High level (thermal) exposure to RF radiation may produce adverse effects in the eye, particularly in the retina, iris, and cornea, although no definitive conclusions can be reached since the studies have used intensities of pulsed RF fields well above the SAR (Specific Absorption Ratio) specific absorption that could occur in the eye from the use of current mobile phones.”
- **Cognitive Effects:** “The [UK] NRPB writes that the few studies that have investigated these issues do not suggest the evidence of an obvious health scare.” The only effects documented are slight decreases in reaction times and an enhancement of the brain’s electrical signals during sleep. RF radiation at typical environmental exposure levels does not increase memory loss or attention deficiency.
- **Children:** No specific health risks have been put in evidence for children. However, “due to their developing nervous systems, greater absorption of energy in the tissues of the head, and their longer lifetime exposure, children may be more vulnerable to the effects of RF radiation.” Therefore, more precautions should be taken with them.
- **Subjective Disorders:** Today, large numbers of people in certain countries still complain about “electromagnetic hypersensitivity,” a poorly defined syndrome that the patients themselves attribute to EMF. However, the BMA report states that “one review [by the Royal Society of Canada (1999)] concluded that existing evidence does not support the [conclusion] that microwave radiation (part of RF radiation) can induce headaches.”
- **Driving:** There is strong experimental evidence that those engaging in mobile phone conversations while driving have an impaired ability to react to potentially hazardous situations. A correlation has been found between phone conversation while driving and an increase in the risk of involvement in an accident.
- **Effects on the Ear:** Mobile phones affect the inner ear in perhaps 5-8% of users causing headache and transient confusion. It has been suggested that hair cells or fluid in the inner ear are affected by direct action of phone radiation or by heat from the phone.

In short, while some minor effects have been observed, no evidence has yet been found on any serious health hazards. The greatest recognized risk lies in phoning while driving.

The most recent study was conducted by the Institute of Cancer Research, London, England. The study found that ten years of using a mobile phone results in no increased risk of a tumor in the nerve connecting the ear to the brain.

Further, the proposed wireless network is at power levels substantially below other common wireless systems and devices. Tables 1-4 and 1-5 show the power level comparison.

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<sup>9</sup> From “*Mobile Phones, Health and the Future of Wireless Technologies*,” Maghiros and Bontoux, 2001.

**Table 1-4: Effective Radiated Power (ERP) of Selective Radio Systems<sup>1</sup>**

System/ Device	Base Station ERP	Handheld ERP	Mobile ERP	Frequency (Hertz)
Analog Cellular (AMPS) <sup>10</sup>	100 watts	1.6 watts	3 watts or less	806-940 MHz
Digital Cellular (PCS) <sup>10</sup>	10 watts	.5-1 watts	1 watt or less	1,850-2,250 MHz
UHF Dispatch Radio	40-45 watts	2-5 watts	25 watts	800 MHz
VHF Dispatch Radio	10-50 watts	1-5 watts	100-125 watts	150-174 MHz
Broadcast Radio and TV	Few hundred watts to millions of watts	NA	NA	550 Khz to 800 Mhz
Proposed WiFi Network	1 watt	200 MW (.2 watts)	200 MW (.2 watts)	2,400 MHz

**Table 1-5: Effective Radiated Power of Other RF Devices**

Device	Max. ERP	Frequency
Wireless Microphone	> 1 watt	>100 MHz
Garage Door Opener	> 3 watts	288 to 418 MHz
Cordless Audio	10 mW (.01 watt)	863 – 865 MHz
CB Radio	500 mW (.5 watts)	26.96 – 27.28 MHz
Car Alarm	94 mW@ 10 meters	13.553 – 13.567 MHz
Wireless Modem/Mouse/Keyboard	1000 mW (1 watt)	72.080 MHz
Remote Control Car	500 mW (.5 watts)	40.66 – 40.70 MHz
Radar Gun	5W in motion, 250 mW Stationary	76 – 77 MHz

For additional information, please refer to the paper, “*Electromagnetic Fields and Human Health*” in Exhibit II, from the Medical College of Wisconsin’s web site. It is updated on a regular basis and is an excellent source of information.

## 1.6 Security Concerns

Many concerns have been expressed over the security of a wireless network. However, the majority of these concerns have arisen due to the relative insecurity of high-speed Internet wireless routers that are available for purchase at most electronics stores.

These routers are designed to create a “hot spot” out of a hard-wired connection, and concerns over their security are often legitimate. Currently, the default setting on most wireless routers does not require that you enter an encryption key to log on. Therefore, anyone with a wireless device can pick up that signal and access the Internet.

<sup>10</sup> Most older cellular phones use analog technology, however, there has been a trend towards using digital and PCS technology lately due to enhancements such as better quality of sound, improved security and wireless Internet applications. Today, most cellular phones use digital or PCS technology.

Wireless networks, such as the one under consideration in St. Louis Park, have a number of security measures and encryptions in place to prevent people from “hacking” into the system. Moorhead Public Service in Moorhead, MN recently asked skilled Internet users to attempt to hack into their new wireless network in an effort to demonstrate that it was indeed secure.

**A properly configured wireless network is as secure as any hard-wired network.**

## 1.7 Legal Considerations

The legislative and legal communities are in turmoil. The introduction of the Internet and technology convergence has blurred lines that once were distinct.

- Internet is not a telecommunications service. The Internet has clearly been defined by the FCC as an “Information Service”, and this definition has been confirmed by the U.S. Supreme Court. However, expect that this definition will evolve as incumbent providers seek to “protect” their businesses.
- Telecommunications includes services that require certification by a state’s Public Utility Commission. The FCC has viewed that certified services generally include carrier and voice traffic, which connect to the Public Switched Telephone Network (PSTN).
- Today’s legislation and regulations are still skittish around bundling the infrastructure and service. In Minnesota, a municipal that decides to offer telecommunication services must obtain a two-thirds majority approval in a referendum.
  - Telecommunications legislation was structured around the PSTN. Each territory had a local exchange provider that was regulated by the state. The local exchange provider installed and maintained a network that was designed for voice traffic.
  - Cable television legislation was structured around the delivery of television programming. The Federal Communication Commission (FCC) provided technical requirements and franchises were operated by the local municipalities. The cable television provider owned and maintained a network designed to broadcast television channels.
- The Internet has created alternatives<sup>11</sup> to the bundled infrastructure and service business model.
  - Efforts to prohibit municipal wireless plans increased in 2004. Although the prohibition efforts failed in many states, expect additional challenges. For example, Senators Ensign and McCain have introduced a bill that would restrict or severely limit a municipal’s ability to advance the availability and affordability of the Internet in a given community.
- Internet providers (including wireless providers) are not regulated by the PUCs, the FCC, or the local municipality.

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<sup>11</sup> Voice-over Internet Protocol (VoIP) and Internet Protocol Television (IPTV).

- At first, distinction between the Internet, cable television, and telephone was easy. The Internet was simply an external network which consumers would access via dial-up modems, similar to fax machines or bulletin boards.
- High-speed Internet complicated this distinction. The cable and telephone companies could provide 24 x 7 connection and speeds 50 times greater than dial-up. Local municipalities applied franchise fee payment requirements to cable modem services. The FCC clarified its cable television regulations, and disallowed municipalities to collect cable modem franchise fees. The FCC stated that Internet services are neither a telecommunications service nor a cable television service, but an information service.
- The introduction of high-speed Internet connectivity has allowed traditional services to migrate to an application that resides over the Internet. For example: Households and businesses can acquire Voice over Internet Protocol (VoIP) telephone service through their high-speed connection. VoIP products are not considered telecommunications services.
  - The Minnesota PUC tried to require that Vonage, a VoIP provider, obtain Competitive Local Exchange Carrier (CLEC) certification. This attempt was overturned by the State Supreme Court. The State Supreme Court decision was upheld by the U.S. Supreme Court.
- Customer choices for high-speed Internet providers are dwindling.
  - Cable television providers are not required to open their system up to other retail Internet providers.
  - Incumbent telephone operators, under a recent FCC decision, will no longer be required to lease DSL circuits to resellers.

The incumbent cable and telephone providers' view is that if they are forced to lease circuits or capacity, the incentives to build infrastructure are lowered or removed. This is the argument made by incumbent telephone providers on why DSL does not have universal coverage today.

The other view is that by not allowing resellers access to networking, consumers do not have choices, and high-speed access prices will remain high due to lack of competition.

## **1.8 Public Process**

We have received a variety of feedback from the public from forms, email, and other means of communication. The material gathered from the public process are included in Appendix A.

## **1.9 Municipal Role in Utilities**

One of the key policy questions is what is the proper role for the City of St. Louis Park. To help answer this question, Appendix B contains material representing various views on this topic.

## 1.10 Action Steps

Initial steps, including a pilot implementation, to launch the wireless broadband utility include:

### 3Q 2005

- Confirm that no Charter or other authorization is required for St. Louis Park to establish a broadband utility.

### 4Q 2005

- Determine whether or not to proceed with the wireless offering, pending a pilot implementation.
- Initiate pilot implementation.
  - Conduct detailed wireless broadband design.
    - + Refine additional fiber optic backhaul cable requirements.
    - + Refine projected fiber access points and coordinate with radio gateway locations.
    - + Establish pole contact agreements with Xcel.
    - + Engineer multi-tenant building solutions.
  - Refine public safety and public service applications, requirements, and benefits.
  - Develop RFP for wireless equipment.
    - + Select the wireless vendor based on the bid responses.
      - Understand vendor stability risk.
      - Obtain software source code and production rights in case of vendor default.
      - Negotiate up front and ongoing support costs.
      - Negotiate vendor maintenance fees prior to purchase.
      - Understand support of public safety requirements.
  - Develop detailed pilot implementation plan that considers health, security and other concerns that may emerge.
  - Select diverse test area(s) for pilot implementation.
  - Solicit residents and businesses in test area to participate in the pilot.
- Prepare for negative advertising.

### 1Q 2006

- Complete pilot implementation.
- Determine whether or not to proceed with the wireless offering.
- Develop partial and full exit strategy options.
- Develop an RFP for the required fiber optic extensions.
- Solicit candidates for identified staff positions.
  - Fill the manager position first (allocation), and then add technical and customer service representatives as needed.

- Develop and issue a Request-for-Proposal (RFP) for Internet back-office, help desk, parental controls, email hosting and other support services. Options range from:
  - Outsource of tier 3 help desk (customer service representatives).
  - Outsource of web-hosting and email servers.
  - Outsource of network operations/monitoring.
  - Outsource of help desk.
  - Include a solicitation for other business models such as open access and wholesale offerings.
  - Develop required Service Level Agreements (SLA's).
- Develop and issue an RFP to obtain access to the Internet.
  - Specify redundancy requirements.
  - Specify performance and availability requirements.
  - Specify exit strategies for performance or other issues.
  - Develop required SLA's.

## **2Q 2006**

- Develop a marketing plan to guide the introduction.
  - Develop trade name/domain names.
  - Register the St. Louis Park broadband domain name.
  - Consider domain names for expansion territories.
  - Schedule advertising and media slots.
  - Develop public relations and marketing plan.
  - Develop advertising campaign.
  - Develop policies for guiding business operation.
- Select initial public safety application.
- Develop a Most Unwired City campaign that aligns with the City of St. Louis Park's economic development plans.
- Begin pre-subscription sign-ups.
- Identify organizations and individuals that are able to offer Information Technology (IT) support and training in the community.
- Identify/coordinate efforts among individuals and organizations to locate excess or new PC's that can connect to the Internet at high speeds, and get them to people who need them.

## **3Q 2006**

- Develop installation guides.
  - How can the wireless bridge be configured to work with existing wireless routers and access points?
    - + How does a user install a wireless card in a laptop? Desktop?
  - Interface to the wireless bridge is via an Ethernet connection. Existing cable modem/DSL wireless routers will work in conjunction with bridge as long as each is configured for a different 802.11b channel, preferably a non-overlapping channel.
- Finalize subscription plans.

- Install and conduct testing on entire network prior to adding the first customer.
  - Target system testing when foliage is the heaviest
  - Strive to turn on large blocks of users the first week.
  - Inform the regional computer suppliers of the interface equipment users will need.
  - Align with local IT support servers to assist in system implementation.
- Begin commercial services.

## **1.11 Minneapolis Wireless Project**

Earlier this year, the City of Minneapolis, MN issued a request-for-proposal (RFP) for the construction and operation of a citywide wireless and fiber network. The business model that Minneapolis chose to pursue is quite a bit different from the one outlined in this report. According to the RFP, Minneapolis is seeking a vendor that will build and operate a wireless network, and in return, the City agrees to buy service from the selected provider.

This type of arrangement is similar to a cable franchise arrangement, in which one provider owns the infrastructure and is also the exclusive service provider. The City will have no ownership or control over the network, and therefore has no control over the service or pricing.

Under the model proposed in this report, the City of St. Louis Park will own and operate the network. The City will set price levels and ensure reliable service.