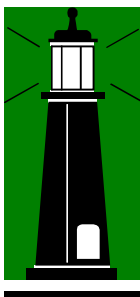


City of Eagan

Report of the
Eagan Technology Task Force
To the
Eagan City Council

Prepared by



**Community Technology
Advisors Corp.**

**The O'Connor
Company**



December 6, 2004

Table of Contents

	Page
Introduction	3
Key Accomplishments	4
Policy Discussion and Recommendations	5
Specific Responses to the Task Force Charge	9
Recommendations for Action	16

Appendices

1. Task Force Information
 - a. Task Force Charge
 - b. Membership
 - c. Meeting Highlights
2. Telecommunications Services
 - a. Provider Analysis
 - b. Provider Inventory
 - c. Maps
 - i. Consolidated Services
 - ii. Qwest DSL
 - iii. Water Towers
 - iv. Topography Map
3. Community Input
 - a. Survey summaries
 - i. Business
 - ii. Residents
 - b. Business Focus Groups Summary
4. Financial Analysis of City Utility ISP
 - a. Presentation
 - b. Spreadsheet (available electronically)
5. Cellular Inventory and Analysis (provided by Thomson West)
6. Presentations Received
 - a. Role of Cities in Telecommunications
 - b. Wireless Overview
 - c. Chaska Wireless Network
 - d. Community Wireless Alternatives
 - e. City Tower Policies

Introduction

The Eagan City Council authorized the creation of the Eagan Technology Task Force at its February 10, 2004 meeting to provide guidance on telecommunications and technology issues. The Council recognized the importance of telecommunications infrastructure and services on community and economic development and wanted to tap into the significant expertise of Eagan residents and business representatives.

Essentially, the Task Force was charged with researching and providing recommendations in three critical areas:

- Research the availability of broadband services for residents and businesses and determine if current services meet the needs of the community.
- Review the availability of fiber optic networks and telecommunications services necessary to support the needs of Eagan's current and prospective large technology corporate citizens.
- Review the desirability of and the options for the deployment of a wireless network or network(s) within Eagan

For each of these topics, the City Council directed the Task Force to make recommendations to the City Council for policies and strategies that will ensure that Eagan can attract and support high quality business and residential development.

Task Force members were recruited and city staff selected Community Technology Advisors Corp. to serve as project consultants.

The Task Force had its first meeting May 7, 2004 and has met monthly. The task force has received presentations from Community Technology Advisors, a variety of city staff, the City of Chaska city administrator and the School District 196 technology coordinator. The task force has had significant discussions about Eagan's preferred technology future, the City's current standing, and strategies for continued growth.

Task force activities are documented is included in Appendix 1.

Key Accomplishments

- Completed a comprehensive inventory and assessment of telecommunications providers, services and infrastructure
- Created an updateable multi-layered map of telecommunications infrastructure and services that is unique among Minnesota communities
- Led a collaborative effort including Eagan's business community, local government, telecommunications providers, school district and residents
- Increased communications between Eagan's corporate technology leaders, creating opportunities for collaboration
- Documented process for maintaining telecommunications infrastructure and rights of way maps
- Created tools that support economic and business development and a broader community perspective on the importance of telecommunications to community vitality
- Created a framework for technology improvements, including improved communications with provider decision makers
- Recommended actions for ensuring Eagan's technology future

Findings and Recommendations

Recommendations are based on a comprehensive review of the current telecommunications infrastructure, current business and resident demand for advanced telecommunications services and broadband, emerging technologies, alternative roles for city government and the expertise of the task force membership.

Situational Assessment

- The Technology Task Force is playing an important and necessary role in gathering information, facilitating discussions and providing policy guidance to the City Council on an issue that is critical to Eagan's long-term outlook.
- Eagan has significant private sector telecommunications services competition in many parts of the community. In some parts of the community, business and residents have their choice of services ranging from DSL and cable modems to integrated services (voice, video and data) over T1 to easy access to fiber optic networks.
- There are significant areas where there is little or no competition or consumer choice of broadband service providers. There are limited, but critical areas where affordable broadband (DSL or cable modem) services are totally absent, especially for small businesses.
- Communities are working to ensure a competitive advantage through telecommunications. Across the country, some cities have become service providers in order to reach their connectivity and economic development goals.
- The City has had great success in leasing water tower space to cellular telephone providers and, in fact, has already leased most of its desirable antennae real estate.
- Based on a large number of examples in other communities, wireless Internet providers are generally unable or unwilling to pay the same lease rates as cellular providers for city water tower locations. A standard practice has been for communities to trade tower locations for high-speed Internet service with a wireless service provider. Existing tower leasing policies are a barrier to attracting a wireless Internet provider.

Recommended Roles for the City of Eagan

The City should act as a Leader by

- maintaining an ongoing task force
- establishing a technology vision and goals that are appropriate, scalable, achievable and affordable
- monitoring progress towards goals and determine the appropriate city response
- mobilizing communities of interest, such as the Large Business group, to find common interest and increase competitiveness

The City should act as a Coordinator to

- discover and exploit opportunities for collaboration and influence with
 - city departments (e.g. Public works, parks, police and IT)
 - other public entities like schools and the county
 - telecommunications providers
 - large telecom users within the community;
 - appropriate regulatory agencies
 - citizens

The City should act as a Researcher to

- identify market opportunities for telecommunications providers
- monitor which providers and services are available
- identify barriers to investment and deployment
- identify service-level gaps and opportunities
- evaluate new technologies and keep city leaders abreast of opportunities
- should evaluate city codes for impact on technology (planning commission)

The City should act as a Marketer of Eagan's telecommunications assets to

- retain existing businesses and residents
- attract new businesses and residents
 - through active use of the city Web site
 - economic development marketing
 - partnering with other economic development groups

The City should consider its role as a Service Provider by

- first focusing on reaching its connectivity goals through the private sector by
 - leveraging its influence, purchasing power and physical assets
 - considering the use of incentives
 - acting as an anchor tenant for a new private sector competitor
- If this approach is insufficient, then determining its options as a
 - wholesaler providing network infrastructure for private sector providers
 - retailer providing services to end-customers

Policy framework

The City should establish and maintain an environment to encourage and provide state of the art and diverse telecommunications infrastructures to assist in the recruitment and retention of residents, organizations and businesses of all sizes. Recognizing that telecommunications is central to economic development and quality of life, the City needs to maintain an ongoing effort to ensure that Eagan stays competitive in this important area by adopting the following goals:

Connectivity goals – Wired broadband services

- There should be a minimum of one provider for each address, whether serving Business, Residential or Public agencies. The City should work towards a higher goal of multiple providers for each address, offering a choice of price, service, redundancy and reliability.
- In areas where there is a monopoly service provider, the City should encourage competition, and monitor and publicize service availability and quality of service.
- The City should maintain a role in promoting ongoing communication between stakeholders, including telecommunications providers, local government, business, education and residents.

Connectivity goals - Wireless broadband services

- For Wi-Fi services, the City of Eagan should encourage deployment of "hotspot" wireless connections as an amenity in public locations (both publicly and privately owned). Any publicly owned "hot-spots" should maintain a commitment to ongoing technology updates. Maintain and publish a map of hotspots/coverage area of wireless services.
- For fixed Wireless services, the City of Eagan should encourage private sector deployment of unlicensed fixed wireless broadband services, including:
 - Encourage deployment through flexible tower rental arrangements
 - Consider tower rental options that reward quality service and eliminates poor service providers
 - Include network security as a criterion in vendor selection
 - Enlist the aid of the community technology expertise, including private businesses, in the evaluation process
- The City should maximize utilization of water towers and reservoirs by implementing an RFI process to determine the range of technical, partnership and pricing options to meet the some or all of the following considerations:
 - Provide coverage to (all of or a significant portion) of the community
 - Enhance revenues to the City
 - Enhance the competitive environment for Internet services

Connectivity Goals - Cell phone

While the examination of cellular telephone coverage was outside the scope of the task force charge, advances in mobile data communications, including messaging, Internet and business communications caused the task force to discuss this important telecommunications service. Telecommunications staff at Thomson West provided an analysis of cellular coverage in Eagan that shows generally high levels of service within the community.

- There should be high quality citywide cellular coverage from multiple providers where dropped calls are minimized and cellular data services are possible.
- Work with providers to understand and fill service gaps

Specific Responses to the Task Force Charge

The Eagan City Council charged the Task Force and its consultants with specific tasks. This information is provided in summary form below; the appendices include specific information.

Assess the public need within Eagan's business and residential community need for additional broadband alternatives and market competition for broadband services, including the likely impact such competition would have.

Large and medium-size businesses are generally well served in a very competitive telecommunications market. Multiple telecommunications providers compete in this market segment. New technologies merging voice, video and Internet over a single T1 circuit are available.

Robust and redundant fiber networks serve the business community, especially near existing major employers such as Thomson West, Unisys, NWA and Blue Cross Blue Shield.

Broadband services and advanced telecommunications are available to many small businesses in Eagan. Competitive providers have co-located in Qwest Central Office facilities and these providers actively market to small businesses. The result is that these firms have a choice of providers and bundles of services. Geographically, this "zone of competitiveness" is similar to where DSL services are currently offered, but is a larger area with fewer gaps in service areas.

Some small businesses do lack broadband options. These firms are beyond the reach of DSL service from Qwest or competitive providers. The Comcast network does not reach their buildings. Costs to extend the service, which can reach into thousands of dollars, are generally borne by the customer. Tenants in multi-tenant buildings could collaborate to share in this cost but would need to organize to do so. A wireless solution may be an option to serve these firms.

Virtually all residents and home-based businesses have access to Comcast high-speed Internet. Some residents and small businesses object to the price of this service and a lack of choice in providers, specifically DSL service from Qwest or other providers. Comcast customers who subscribe to cable television and/or telephone do receive a discount for their "bundled" service which makes Comcast Internet more affordable, though still significantly more expensive than Qwest DSL. Qwest also provides incentive pricing to bundle multiple services.

Broadband Price Comparison

<u>Provider</u>	<u>Service</u>	<u>Down/UP Speed</u>	<u>Price</u>	<u>Bundle Price</u>
Qwest	DSL Deluxe	1.5M/896k	\$44.99	\$39.99
Qwest	DSL	256k/256k	\$31.99	\$26.99
Comcast	High Speed Internet	4M/384k	\$67.95	\$52.95
Comcast	High Speed Internet	3M/256k	\$57.95	\$42.95

Both Comcast and Qwest require a modem or gateway. Subscribers can purchase or rent these devices.

*As of November 12, 2004

Determine the feasibility of additional broadband capabilities in Eagan, including specifically:

...the need or desire for “redundancy” within the Eagan business community.

Competitive providers in Eagan provide choice in redundancy. Major providers are all capable of providing multiple routes to the Internet. Some businesses choose to subscribe from multiple vendors to provide redundant service.

Some large businesses have concerns that most Internet traffic from Eagan routes through network facilities in downtown Minneapolis, St. Paul and Chicago. They would prefer supplemental routes that avoid these locations and travel directly to Des Moines, Kansas City and Denver. Members of the large business community and the consultant identified additional routes, but this remains an issue.

...whether Eagan needs or should pursue wireless hot spots within the City, given the proliferation of handheld devices.

Input from the Eagan business community points to the growing importance of wireless communications. Many of these devices work well with the growing digital cellular network provided by Sprint, Verizon and others.

Eagan has a number of hot spots, primarily in hotels and coffee shops. Companies offer this service as a marketing strategy and in response to competitive trends in their industries.

Based on a survey of a small sample of Eagan residents, top choices for public accessibility for wireless would be the schools and libraries, followed by other public buildings. These might include the community center, civic arena and city hall.

Wireless hot spots may be appropriate in Eagan commercial areas where affordable broadband access is not available. It is feasible for the building

owner or a single tenant to obtain T1 service from Qwest or another provider and share that connection to other building tenants via a wireless network. The City could propose that solution to building owners or businesses that express dissatisfaction with availability of high-speed Internet services.

...whether a wireless network within Eagan is feasible.

Respondents to the same resident survey offered strong support to the concept of a citywide network. Some communities are offering or planning to offer citywide or hot spot wireless services. Three examples are Chaska and Philadelphia (citywide) and Spokane (large downtown hotspot). Chaska is offering WI Fi service through most of the community.

Chaska has three assets enabling the provision of Internet service in a cost-effective way. Chaska benefits from a free city owned fiber optic network installed by a competitive service provider several years ago in exchange for easy right of way access. The city has a long tradition as the municipal electric utility that provides ownership of utility poles, access to electricity at the WI Fi radio facilities and customer service and technical staff. The city also received a \$400,000 grant from 3-Com that provided back-office Internet equipment. These assets smoothed Chaska's way into the Internet Service Provider business.

Spokane's downtown hotspot serves a large number of businesses, business travelers and college students. Wireless Internet service is just one of Spokane's economic development strategies to enhance the viability of a redeveloping downtown area.

It is very unclear how Philadelphia plans to operate and pay for its wireless Internet strategy. They have announced that they plan to subcontract their network operations and customer service to a private sector vendor. The cost estimate to construct the wireless network is \$10 million; no estimates are available on operational costs.

Eagan is lacking a significant wireless capability. A private sector fixed wireless provider using the city's water towers would provide a second or third choice for high-speed Internet service. This type of network is technically and financially feasible and installed quickly.

A partnership led by a private sector ISP that would include the City of Eagan and Dakota Electric Association might be a successful model for deploying a Wi-fi network. This would combine the assets of each of the partners and increase the probability for success.

...whether additional broadband capability or other technology infrastructure improvements create an economic development /business recruitment/retention advantage

Eagan's existing fiber networks and competitive provider situation creates an economic advantage compared to several parts of the Twin Cities metropolitan area. The cluster of high technology companies like Northwest Airlines, Thomson West, Blue Cross Blue Shield and Unisys has lured significant telecommunications investment by providers.

Eagan would benefit from the creation of a regional Network Access Point that could consolidate Internet traffic and might attract providers to install additional fiber routes. Several companies have existing data centers that could house such a facility. Further discussions among large data users are necessary to determine feasibility.

Enhanced wireless Internet services would significantly benefit the Eagan community. The city would reach its proposed goal of at least one broadband provider to each address, regardless of Qwest's DSL rollout schedule and ultimate DSL coverage area. Most addresses would then have two or more options for broadband services. Wireless would provide businesses with an affordable option for redundant connections.

Eagan businesses and residents would benefit if quality wireless Internet services were available within the community. While the task force does not recommend that the City provide this service directly, it does recommend that the city take action to encourage the development of a wireless network operated by one or more private sector Internet Service Providers.

Our analysis of current and emerging technologies, of Eagan's development pattern, of the most likely service providers and other factors indicates that the most feasible and easily deployed wireless network would use fixed wireless (existing technology) or Wi-Max (emerging technology). The selected provider could use Eagan's water towers/reservoirs to serve prospective businesses and residents. Private sector providers could utilize their existing network equipment and customer service facilities to provide cost-effective service through the benefits of economies of scale to Eagan customers.

The options and costs for options to pursue desired technology goals

The task force focused on private sector solutions to ensuring quality and affordable high-speed Internet services in Eagan relieving the City of financial responsibility for telecommunications investments. Based on the following analysis, the task force recommends that a private sector approach is correct for the City of Eagan.

Internet Service Providers operate in a business sector where technologies and business practices are changing rapidly, creating an uncertain environment. ISPs require a combination of highly technical and customer service staff that can be costly to recruit, train and maintain. Evolving threats of viruses and spam require regular expenditures to protect the network and customer base. These factors make the prospect of operating a municipal ISP unappealing, especially when Eagan does not have the valuable asset of a municipal electric utility.

The consultants developed a financial projection for estimated costs and revenues for an Eagan municipal WI Fi network. A complete and interactive financial model is provided as an appendix allowing users to adjust assumptions regarding costs and revenues.

Community Technology Advisors used assumptions based on industry knowledge and experience. To achieve break-even status while covering only operating costs, the monthly customer subscription fee would be around \$40. Estimated start-up capital expenditures in the first year would be close to \$500,000. The customer service, billing and technical systems required to be a successful Internet Service Provider discourage the feasibility of small ISPs. Even if every household and business in Eagan were to subscribe to the service, the City of Eagan would still be a very small ISP compared to Earthlink, AOL, Comcast, etc.

Chaska charges \$15 per month for its service and forecasts that it will pay off its capital expense in three years. Chaska's has numerous operational advantages, listed previously. Chaska has also avoided significant operational costs, including limits on customer service calls to 8 hours per day and outsourcing all complex technical customer service charged on a fee basis to customers.

Potential for enhanced City revenues by making tower space available to a wireless broadband provider who would revenue share.

The task force recommends that the city issue a Request for Information to prospective wireless Internet providers to determine the range of alternatives for a positive business relationship.

Proposed rents, or financial sharing arrangements, are likely to be significantly less profitable than that received now from each cellular provider. Wireless Internet providers often offer Internet services for municipal buildings and vehicles in lieu of at least some portion of cash rent. Internet radio equipment is also much smaller, lighter and less dependent on specific tower locations so adding wireless Internet equipment does not imply

removing cellular equipment. Any newly installed equipment must not interfere with other providers or vital police and fire communications.

While not discounting enhanced city revenues as a goal, the task force elevated goals of citywide coverage, state of the art services, security and customer service above income as criteria for vendor selection.

Any other significant technology infrastructure recommendations the task force has for the continued prosperous growth of Eagan as a desirable place to live and work.

Current wireless technologies are WI Fi (generally short distance, non-line of sight and portable) and fixed wireless (long distance, line of sight and tied to a location). A new technology called Wi-Max will combine the best of these technologies and add mobility. This technology is in testing now and predicted to be widespread in the marketplace by late 2005 or early 2006.

The task force recommends that any agreement with a wireless provider should require the use of technologies equivalent to the promise of Wi-Max.

In concert with the consultant to the project, develop a reproducible methodology for measuring the technology infrastructure in the future.

There are two components to measuring connectivity in a community -- facilities and services. Telecommunications providers are already required to provide maps of facilities when they install fiber optic cabling in City of Eagan rights of way. Telecommunications providers have been reporting to the city for some time. Staff use these maps to coordinate rights of way placement and planning.

Staff is entering this information into the city's GIS system. Some providers have placed specific usage restrictions on this information for security and competitive considerations. Maps released to the public must not violate usage agreements.

Community Technology Advisors Corp. has entered the Telecommunications Provider Inventory into its TELPOD database. A copy of that report is included in this report in Appendix 2.

Eagan staff received training on this system and have a password to update information as it becomes available. Eagan staff will be able to use the Community Technology Advisors Corp. survey tool used to gather this information. This information is available to the city staff in a database format downloadable into commercially available database programs for use in other ways.

These tools will provide a significant advantage to the City of Eagan in its economic development activities by enabling staff to provide business prospects with current, accurate information on telecommunications infrastructure and

services. In addition, this project has created a positive relationship with the provider community that may pay future benefits.

While some communities may have lists of telecom providers, Eagan is well ahead in mapping and real knowledge of provider capabilities.

Recent discussions with city public works employees have uncovered important information about rights of way in the northern quarter of the City where multiple carriers have installed fiber optic cable in the ROW. In fact, some businesses have multiple providers serving their facilities. Crowding in the ROW is a real and growing concern. Effective management of the ROW is essential to ensure that there is adequate space available for all current and future ROW users. Additional research is underway to determine the best alternatives for managing the ROW in this area of Eagan.

Bring any significant public policy issues back to the City Council prior to completion of the Task Force's work.

Completed at Council workshop on September 13, 2004.

At this meeting, the Council directed staff to review possible partnerships with Dakota Electric Association to provide Wi-fi services. After a meeting and some follow-up discussion, a consensus emerged that a lead Internet Service Provider would be a desirable third partner to bring expertise and economies of scale to the venture. Electric utilities are closely watching Broadband over Power Line (BPL) technologies as they are tested in several markets. BPL could provide another alternative.

Recommended City Actions

Immediate

- Discuss and adopt the recommendations of the technology task force as appropriate.
- Formalize the Technology Task Force as an ongoing body. Review membership and consider representatives from the education and health care industries. Any appointed task force members should have a strong technology background and represent key community segments, such as business, education and health care.
- Develop and issue a Request for Information to prospective wireless providers.
- Maintain close contact with Qwest to ensure DSL deployment and promote other market opportunities.

Short Term

- Post Telecommunications Provider Inventory and Wi Fi locations on the city's web site.
- Open discussions with Comcast to deliver services to unserved commercial sites
- Encourage competitive providers to pursue opportunities to serve Eagan businesses aggressively.
- Consider a requirement for new construction projects that telecom conduit be required in parking lot construction

Intermediate Term

- Design and issue a RFP to prospective wireless providers for the delivery of Wi-Max services.
- Survey all or a statistically valid sample of Eagan residents regarding telecommunications issues
- Include telecommunications and technology issues in Business Retention visits.
- Convene at least quarterly meetings of the Technology Task Force
- Investigate the Intelligent Community Awards (www.intelligentcommunity.org/) and other community technology recognition programs and determine if Eagan should apply for recognition

- Bring the issue of restrictions of fiber on bridge crossings to the attention of the MN Department of Transportation, the Metro Council, and Homeland Security. Involve the Dakota County and the Eagan legislative delegations.
- Consider changes in municipal rights of way ordinances to ensure proper management and that telecom provider investment is not discouraged.