



## MEMORANDUM

**To:** David Ramsay, City Manager  
**From:** Brenda Cooper, Chief Information Officer  
**Date:** September 26<sup>th</sup>, 2006  
**Subject:** Kirkland Free Wireless White Paper

### Introduction

We are about three months into an eighteen month pilot program for the Kirkland Free Wireless project, which is primarily targeted at parks, but also covers some of downtown. This white paper is designed to inform Council where we are at this time, and prepare Council for future decisions on this project.

### Our Current Network

This summer, we began to provide free wireless in Peter Kirk Park, Marina Park, and parts of downtown.

The primary coverage area is within the dotted outline below:

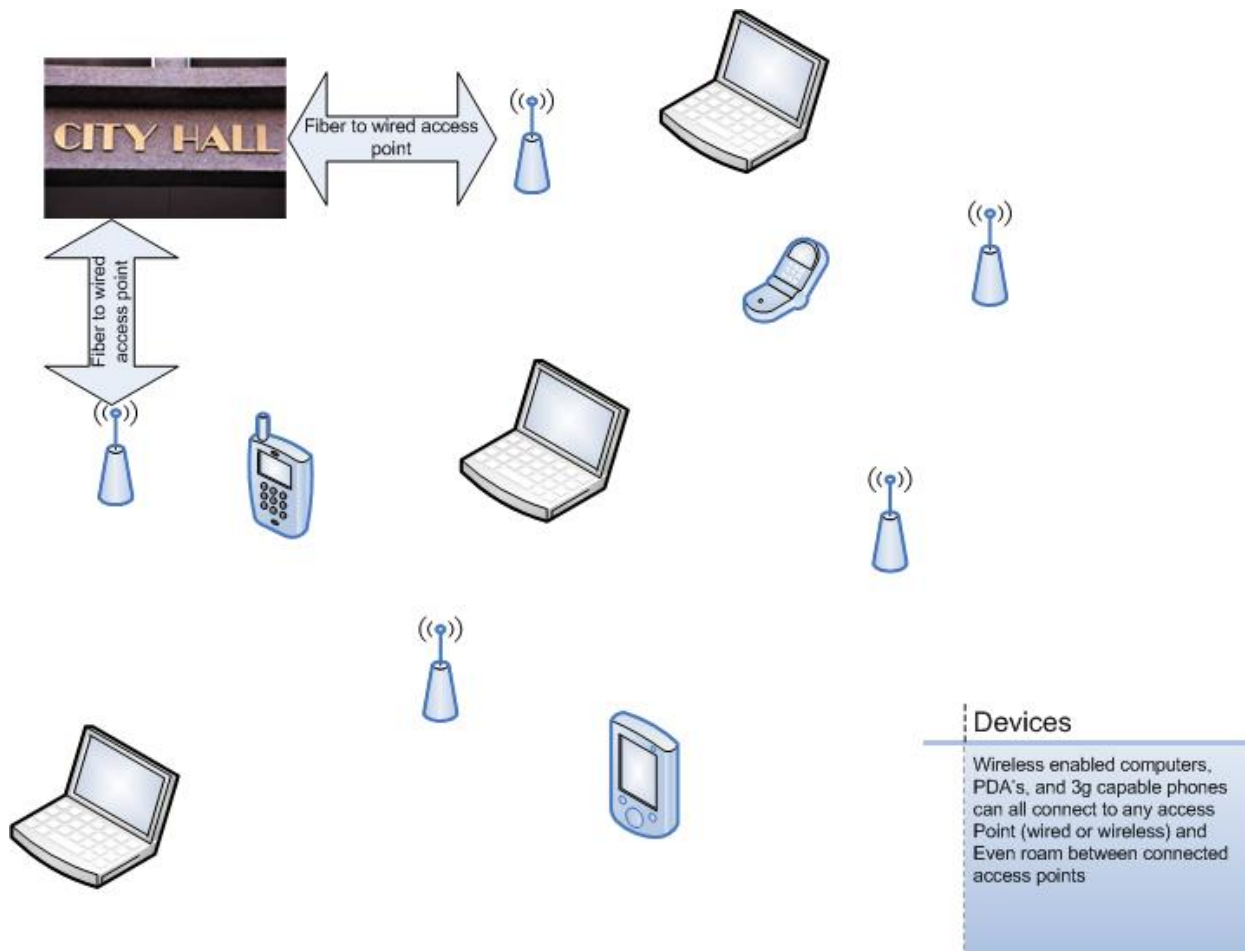


Due to the nature of wireless networks, there is some signal overlap into adjacent areas and there are some weak spots, particularly around the perimeter of the coverage area and in heavily treed locations. The public network is also available in all of our buildings, so that City Hall, the Court, Fire Stations, and other city locations which have our secured city network also have an open portion of the network available for the public, vendors, volunteers, and others to use in those buildings and sometimes in adjacent areas.

The project was originally funded for \$114,671. Since we had to change technology completely from planning to implementation, we ended up combining funding to get fiber to Heritage Hall and for getting video systems into the parks so that we can show live video of baseball games and events like the Christmas tree lighting (which we are still working on) enabling us to stay within budget. We have funding to cover the maintenance costs through the end of the pilot period, and have requested a service package to carry us through the biennium.

## Wireless Technology

Wireless networks need wires. That is, for every wireless network, there are one or more traditional wired connections to the internet. For example, we have 11 wireless access points that work together to provide the coverage we have now in the parks and downtown, and two of those are connected by wires (fiber optic cable) back to City Hall.



Any expansion of the network will also require fiber optic cable to the area where we want to extend the network. We do have fiber in many areas of the city, but not everywhere. Depending on whether or not there is existing conduit or overhead pole space, the cost of extending our fiber network can vary widely.

## Stakeholder Reaction

We specifically ask people to provide us feedback on the first page that users see. So far, the vast majority of emails people have sent have been very positive. Council has been briefed once on these, so I have added the new ones we've received since the last time we provided written copies of emails.

### Feedback:

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Thank you for the service. It is very valuable to me as I work out of my home and can bring my "office" to town any time I need to.

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No offense, but I'm pretty offended you used my taxpaying dollars to fund wireless in a park!! I could think of NUMEROUS ways to better spend my money. It should have been voted on with a budget of how much it was going to cost. By the way, how much DID it cost us taxpayers? Thank you.

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Love being able to access wireless while waiting for a meeting at Hectors!!!

Would be absolutely perfect if I could get a VPN connection. Thank you. Super service

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Hi there,

My wife and I are currently in the process of moving up to downtown Kirkland and I am very excited about the prospect of using wireless internet connection while hanging out in the downtown and park areas. I would like to suggest a default homepage for all users who connect to the wireless internet. I am thinking more along the lines of how one connects at Barnes and Noble or a local hotel. You first physically connect and then your browser loads a default page where you have to agree to certain terms and conditions. This would be a make a great entry way into other information such as news and events for the area. For those of us who are just coming to the area, this would be a great way to learn what Kirkland has to offer.

It's a great idea!

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As a real estate agent in Kirkland I think this is a good idea. I am sure it will get used a lot.

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Hi – I think this is a great project – thank you and congratulations!

I wonder if it would be possible to provide wireless access say from Market, along 5th Ave to 3rd St, and then down 3rd to 2nd Ave S to Lake? Even for a fee? Thanks

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I just read in the Kirkland Courier that the City is beginning to experiment with public WiFi access. As a Kirkland resident for over a decade, I think this is excellent and wanted to voice my support. Expanding the uses of our public spaces in this way is an excellent investment, and will hopefully find more residents using our parks, and in many new ways as well.

Has the City given any thought to experimenting with providing this service to businesses in the downtown (or other commercial areas) as well? For some businesses -- retail, hospitality, especially -- having WiFi is something that is not core to their business, but could allow them to offer some benefits to their customers. Rather than expect a small restaurant, coffee shop or gallery to set up and maintain their own access point, a city-provided WiFi service could allow their customers to connect to the internet easily from their business. Even better, with a single provider, logging on would need to take place just once and greatly improve the experience for network users. I would like to think that WiFi would also make Kirkland a more attractive location to set up a business, and that is certainly a good thing.

Again, best of luck on the experiment. I will be watching it closely, and hope that it proves successful.

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I came across the WiFi in the parks effort – very cool! I'd love to hear about the experiences and lessons learned...On a personal note, I'm pitching the idea my remote office is going to be at Marina Park....

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I love the new Kirkland Wireless Network! It is so nice to be able to work while sitting in the parks or by the water. :) It allows me to leave my home and be a more social creature - which in turn makes my life a little better! I'd love to see a more expanded wireless network. It is hard to locate a signal in a few places I like to frequent, but I think with time you'll be able to make it better!

Thanks again for the network

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Thank you for your telephone message earlier today (Wednesday) regarding the wifi project. I've taken some time to learn about the current project from the city website you pointed me to.

I have not actually used the downtown park wifi yet. I don't spend much time downtown. I have, however, used the free wifi from several King County Public Libraries in Kirkland and the Eastside. I think it is fantastic to offer wifi to as large an area as possible. I would support a city decision to offer wifi to the whole city if it is reasonably affordable.

I realize that government resources are finite and the funds must compete with other projects and services. It seems to me, though, that city-wide wifi is a service that would benefit a large number of kirkland residents and patrons of kirkland businesses. So if one of the city goals is to provide services that benefit the greatest number of residents, it seems that city-wide wifi would be a desirable option.

Thanks again for quickly responding to my phone inquiry. I look forward to any news related to this topic.

For your reference, I have lived in the North Rose Hill neighborhood for about 10 years.

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Thanks for providing the service! We're on a boat in the marina, visiting Kirkland.

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Even though I live in Monroe, I spend time in Kirkland during the summer because of the marina and of course my boat.

I tried to access wifi on my pocket pc but every time I clicked accept nothing happened. A boat next to me seemed to be able to use your wifi with no problem.

My pocket pc found your network with no problem and even said it connected but I could not get my outlook email to download my email.

Hope you continue the service. Thanks

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I would like to see a weather station installed at Marina Park, preferably at the boat launch ramp dock but the Marina Park dock would be OK too. The station would provide useful information to park users on up-to-the minute conditions such as wind speed, wind direction, and precipitation. The information would be accessed by computer users via the internet.

Here is an example of the presentation from the Northshore Utility District station in Kenmore:  
<http://www.weatherunderground.com/weatherstation/WXDailyHistory.asp?ID=KWAKENMO4>

I am not expert in the technology but it appears to be "off the shelf" with hardware and software cost combined less than \$1,000 (not including installation)

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Today I took a vacation day to watch my nephew. Early this morning I discovered I had a deadline at work I had to make--crisis! I decided to work on the grant proposal while my nephew swam at the Kirkland Pool, then rush home and email it in.

Imagine my surprise when I opened my laptop, sitting in the shade of a tree between the pool and the senior center, and found that I had WiFi, courtesy of the City of Kirkland!

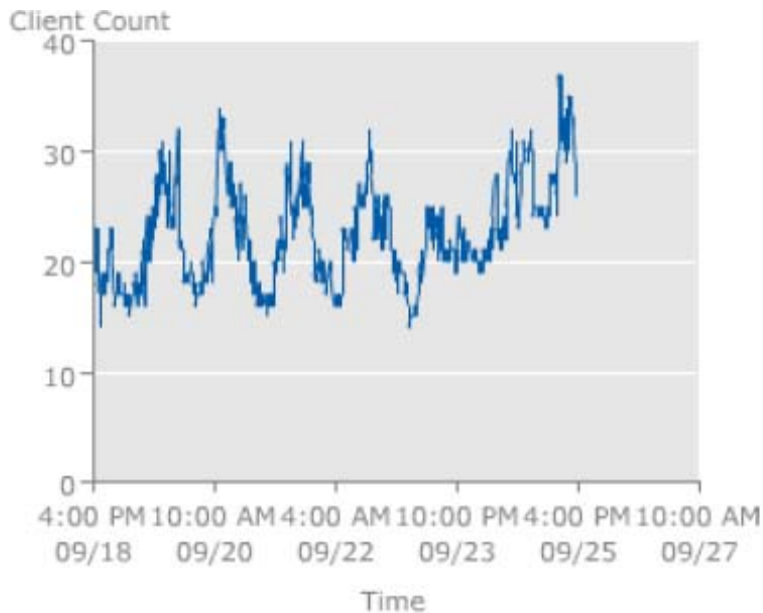
I was able to finish my grant proposal and email it in, feeling relaxed. Also answered work email, worked on some annual performance evaluations, carried on email dialogues with colleagues--all while simultaneously taking care of my family obligations and enjoying the last few warm hours of summer.

Thank you very much! Wanted to let you know this service will be used, and was accessible from the location I described.

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## Usage

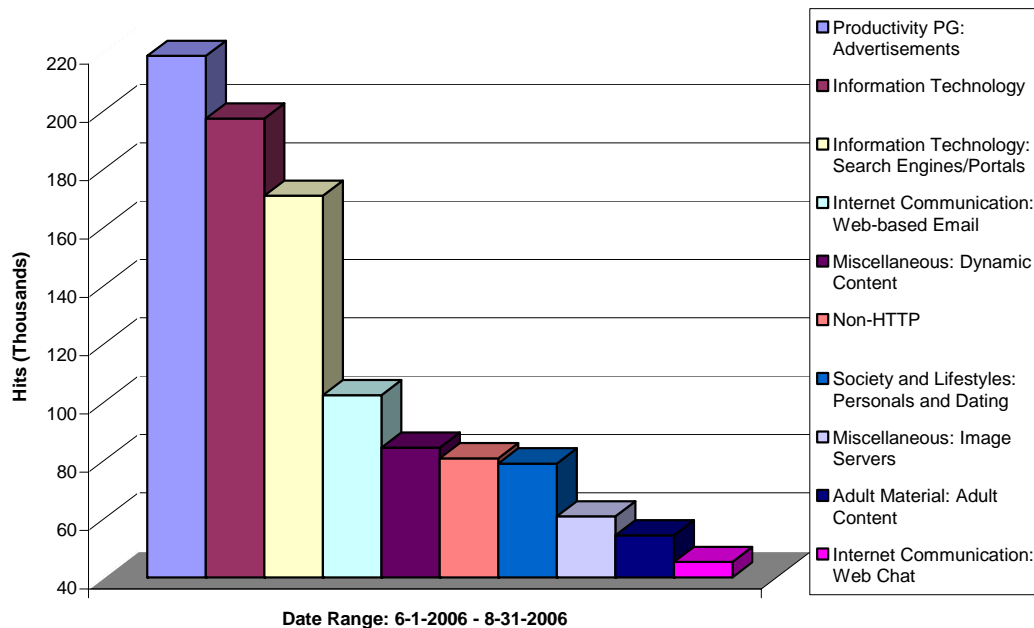
The most recent usage report, shown below, suggests that between twenty and thirty users are typically on the network at any one time.



This has increased slowly over the past few months as the network has become more stable and more people have become aware of it.

We do categorize types of hits, and keep logs of actual sites visited, although we can't necessarily track visits to a specific user. We are collecting this data to get a sense of the way people are using the network, and because it is required in our contract with Comcast, who provides our connection between the public parts of our wireless systems and the internet. The graph below shows the top ten categories of uses for the network.

**Kirkland Free Wireless  
Top Categories by hits**



When we initially deployed the network, we did not block adult content. We are now experimenting with blocking adult content, and have had one complaint from a regular user who has communicated to us that the filtering interferes with his communications with clients he does business with. We will continue to analyze this, and would be interested in Council’s feelings on the topic. To put the decision we made to try filtering into context, we have read recent articles that suggest that free wireless networks can be used to allow children and teenagers to access adult content. Note that we do filter our own internal networks in the same way, so that adult content is not available via our networks to city staff while they are on the job. We are not trying to make any kind of statement about whether or not adults should have access to legal adult content. Nor do we have a recommendation yet about whether or not we should continue to block adult content

## Support

We do not currently provide any useful real-time support, nor have we had any complaints that there is no direct support. We post information on our web page, monitor the network ourselves to make sure it works, and respond to email. Occasionally, citizens have obtained phone numbers, and when they have made that effort we have returned their calls.

During the initial ramp up and testing period (which was much tougher than we anticipated), we spent a considerable amount of staff time on support, primarily on testing. Occasionally the staff time cost was as high as seven or eight people testing per day for at least a few hours a day. Since the network stabilized in late August, we’ve probably spent an average of less than two hours a day department-wide to test, monitor, respond to citizen emails, and otherwise support the network. This is actually less than we anticipated, and the overall stability of the network has been a pleasant surprise.

## **Future Decisions**

Near the end of the pilot, Council will be asked to provide direction on the Kirkland Free Wireless Project. Those choices should be made in context to perceived and planned benefits of public wireless.

### **Context: Kirkland's Networks**

Any public networking effort should be considered in light of the commercial offerings also available to potential users. In Kirkland, we have an excellent mix of vendors and technologies available to most residents, and in some cases, to visitors.

Kirkland has wired broadband available from Verizon (DSL) and Comcast (Cable). Verizon has started upgrading their network to be significantly faster than their current offerings via fiber to the home. Kirkland-based Clearwire has announced an intention to provide a high speed regional wireless network. This means Kirkland consumers could have up to four commercial choices to make (Two options from Verizon (FIOS and DSL), cable modem via Comcast and wireless from Clearwire)

Note that ONLY Comcast has build-out requirements (that is, only Comcast is required to provide service to all households in Kirkland). Verizon DSL is available in most areas, with availability driven by proximity to phone switches (central offices). So far, Verizon's higher speed service is being permitted and built in areas where overhead technology or existing Verizon conduit exists and the potential customers are in more expensive homes. That's a very logical place to start, but we don't yet know if Verizon intends to offer the service city-wide. That will be a subject of negotiation if we are able to move forward with a video franchise. Clearwire may by its very nature become available city-wide, or very close to that (Clearwire is a Wi-Max based proprietary technology that should reach any house not heavily blocked by trees or in a particularly difficult place to get connectivity like low areas between hills).

There are also other wireless networks available both in our coverage area and in other parts of the city. Some local businesses (for example, Kahili Coffee and Tully's) offer free wireless access and others have fee-based services (Starbucks and some other coffee shops).

In summary, most Kirkland residents already have some choice of providers and the level of competition is expected to increase. This should help keep prices down and service levels up.

We do have a small digital divide in Kirkland (citizens who can't afford high-speed access). Our currently available ways to meet that need include the Kirkland branch of the King County Library where both computers with internet access and a wireless network for people with their own computers is available, and our own free wireless system.

### **Context: What are Other Cities Doing?**

There are a variety of strategies and business models being executed in various cities.

Some are deploying city-wide wireless networks primary for city workers (such as police and fire) use, and allowing citizen access at wireless hot spots as appropriate. Renton, Washington has done that. See <http://www.ci.renton.wa.us/fis/wireless.htm> for information.

Other cities are partnering or attempting to partner with major providers (often through the RFP process) for city-wide wi-fi networks. San Francisco, California has a tentative agreement with Google and

Philadelphia, Pennsylvania has an agreement with Earthlink. Other city partners include companies like Harborlink, who will come in, set up a network, and provide a combination of free and for fee services in exchange for the ability to sell ads which appear on the user's screen every twelve minutes.

In some cities, non-profit organizations have been set up to encourage and spread free wireless access. For two examples of that (Austin, Texas, and New York City, New York), see:

<http://www.nycwireless.net/about>

<http://www.austinwirelesscity.org/about.php>

Companies are providing free city-wide wireless networks in some cases. For example, Google has pledged to provide free wireless throughout Mountain View, California. The likely payoff for Google, besides having access throughout the town they are headquartered in, is to be able to experiment with geographically based content and ads.

There is a very good interactive map of national projects at

[http://news.com.com/Municipal+broadband+and+wireless+projects+map/2009-1034\\_3-5690287.html](http://news.com.com/Municipal+broadband+and+wireless+projects+map/2009-1034_3-5690287.html)

Very few city-wide wireless networks are operating yet, and even fewer have been running for more than a year or so. It is too early to tell what the successful business models will be, and it's likely that some rather expensive and newsworthy failures will have lessons for us. As we further evaluate our future directions, we will periodically check-in with other cities to see how their projects are doing.

## Why Wireless Networks?

Reasons to deploy public networks (wired or wireless) include to support economic development, encourage tourism and downtown (or locational) visits, provide citizens with access to network in public places (for example, help parents or others multitask), deliver city services, help city staff communicate from the field, fill a digital divide, encourage competitive behavior on the part of private providers. The table below outlines how those reasons play out in Kirkland:

Reason to deploy network	Fit	Comments
Support economic development	Good	So far, we have heard from some local businesses that they appreciate the wireless network. We have also received notes from people to travel locally or telecommute, and have used the network to do their job.
Encourage tourism and downtown (or locational) visits	Good	All network users are initially sent to our explorekirkland.com web page. Since users from outside of Kirkland have used the network and emailed us, it is being used by tourists. Since it's stabilized, we could probably begin to promote the network in tourist-oriented literature.
Provide citizens with access to network in public places	Good	We do hear from Kirkland residents regularly. We've also heard from users at downtown events.
Deliver city services	Future	While we aren't spending the time or resources to create new applications, if the network moves past the pilot stage we could use it for context sensitive mapping (If I am at WAP X, where is the nearest coffee shop or public restroom?), for directions for walks (imagine getting directions downloaded to your phone), etc. The larger the network is, the more useful it could be for service delivery. Note that any new services would have development and



		support costs associated with them.
Help city staff communicate from the field	Okay	At the moment, our wireless network footprint is too small to be a significant help in this area. We are able to have meetings downtown or in one of the parks and connect to the city system, and the Peter Kirk Pool staff can now use the system (which won't matter until next summer). It does provide an additional hot spot that police or fire could use if needed.
Fill a digital divide	Helpful	Meeting digital divide needs actually required access, computers, and training. This network does provide access, but as of this time we are not addressing the other issues. Note that Kirkland branch of the King County Library does also provide computers. We have heard from college students who report they can't afford connectivity and really appreciate the network, so we are providing some modest services in this area.
Encourage competitive behavior on the part of private providers	Not a key driver here	We do have reasonably competitive telecommunications offerings in Kirkland. We have done high level estimates of cost/benefit to install city-wide wired or wireless systems, and at this time the cost and risk are both too high to recommend the investment, and the "gap" to be filled is fairly low. We will continue to monitor this situation since there is a logical case for local government to own and manage fiber and lease access to entertainment or other providers.

### ***Possible Next Steps***

The options for next steps break down broadly into:

1. **Discontinue the service**
2. **No changes**, leave the existing network up and have it work the way it does. This will require periodic replacement of the hardware and software (we estimate every three to five years) and approximately \$15,000 a year for software and hardware support, plus a little contingency.
3. **Expand the network slowly on our own**, sticking to public areas and business districts, and expand as it makes sense. For example, work with the Totem Lake developers to get conduit and fiber in the ground during construction, and consider lighting new parks as fiber is run by the locations. Each potential location could be evaluated separately.
4. **Expand the network city-wide**, which would require that we develop public private partnerships, limit access, require accounts or some kind, and probably deliver advertising to free users. This is most like the San Francisco or Philadelphia models. It is the highest risk and highest cost option. It would allow us to deliver a more stable but perhaps less user-friendly service. In the most optimistic of the business models, we could make money or gain significant access for ourselves (which would allow us to save money). This option would put us into the best possible position to provide services via the network, and help us avoid ongoing connectivity costs for mobile workers. It would also put us directly into competition with any private providers we did not partner with and probably provide benefit to private provider(s) we do partner with.

If we had to make a recommendation today, we would opt for option three; *expand the network slowly on our own*. This provides a high quality service that is fairly uncomplicated and simple for us to administer and for citizens to use. It avoids direct competition with existing providers, and keeps a nice public/private balance.

Our second choice would be to look at a city-wide network because of the benefits such as provision of services and access by city staff (and thus avoidance of connectivity costs for mobile workers like public safety and inspection staff) and the dynamic possibilities of partnership with leading vendors. However, this option only makes sense if we can provide equal or better coverage than the incumbents (get at least as good a coverage for our mobile workers and thus save ongoing money), and plan to invest funds in developing services.

### **How will we frame the decision?**

We think the following information will help us frame the choices in more detail for Council:

1. We would like to collect more extensive and statistically accurate data from citizens. The collective tone of the feedback that we do receive is overwhelmingly positive, but that feedback almost all comes from users of the service.
2. We hope to gather more information on the success or lessons learned from other city wireless projects. This will probably take time since this is a very new service with untested business models that vary greatly one to the other.

### **What can Council do the help?**

Primarily, it would help to have Council gather information.

1. Please let us know what you hear from your constituents.
2. Consider using the network yourselves.
3. Please consider including survey questions regarding this service in your next community survey.

We also have a high interest in your opinions as we go along, and if you have specific ideas you would like us to explore, please let us know what those are.

### **Recommendation**

At this point, we hope that Council will leave the pilot running essentially as-is, and fund the continuance of the current network through this biennium. We hope to explore this further with you in the mid-biennium process next year when we have closer to a year of operation to draw on, and have had time to gather more data. An acceptable alternative would be to re-evaluate these options during the next biennial budget cycle, leaving the current services in place until then but without expansion.