Municipal WiFi Networks

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Councillor
Darebin City Council
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1.   KEY LEARNINGS FROM THIS RESEARCH PROJECT

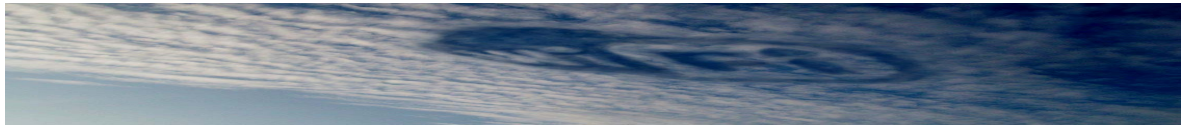+ Municipal Wi-Fi networks should be seen as council business of the 21st century much as roads, rubbish and drains were for the 20th century.

+ Councils need to have a clear case for building municipal Wi-Fi networks, bearing economic development in mind.

+ Small and medium sized councils (both city and rural) that have established municipal Wi-Fi networks have a greater success rate than big cities.

+ Councils that have seen early success with municipal wireless networks have been able to articulate very clearly to councillors and residents how the network will be used and how it will benefit people.

+ Councils don't need huge funds to establish and maintain a wireless network. Road works can cost more than a small pilot site in a business activity centre.

+ Community expectations need to be carefully managed when councils decide to deploy a municipal wireless network.

+ It is good to have a coherent business model for building and sustaining the network.

+ Municipal Wi-Fi networks are mainly suitable for outdoor use, given the nature of the W-Fi signal. Indoor use requires extra resources.

+ Council should proceed cautiously and start with the deployment of demonstration sites in activity centres or frequented open spaces.

+ Wi-Fi access outside the home is an emerging community expectation.

2. ACKNOWLEDGMENTS

TABLE OF CONTENT

Page

3.   MUNICIPAL ASSOCIATION OF VICTORIA LOCAL GOVERNMENT FELLOWSHIP AWARD APPLICATION

The application to undertake this study was made to the MAV Local Government Fellowship Award supported by Macarthur's Management Services.

The four main objectives of the study tour were as follows:

- To gain first hand knowledge from a selection of medium-sized overseas municipal governments (city and rural) that have successfully implemented and maintained a wireless network in their city.

- To examine the benefits a municipal wireless network can bring to a city and its residents and investigate the key issues and challenges faced by local councils.

- To survey the business models that have been employed to implement and successfully sustain a municipal wireless network.

- To examine how the lessons learned from overseas experience can be applied to the Victorian local government sector.

4. Executive Summary

Objective

The main objective of the five week study tour was to examine the benefits of municipal Wi-Fi networks and survey suitable business models appropriate for Victorian local government. Nine cities with municipal wireless networks in North America, Europe and Oceania were examined. Most cities visited were small to medium sized, ranging from urban to rural.

Benefits

What are some benefits for councils in establishing a municipal Wi-Fi network and providing free internet services to their residents? Below are some of the experiences of overseas councils

- o Overcoming the digital divide
- o Promoting economic development
- o Enhancing tourist and business infrastructure
- o Increasing council productivity and operational effectiveness e.g. field work and working from home, real time meter and weather reading, CCTV, traffic management, police and emergency services.
- o Promoting community connectivity

Business Models

Four main business models were explored through examination of the municipal Wi-Fi networks of nine different cities: Auckland - NZ, Ponca Anderson and Albany in the US, Fredericton – Canada, Swindon -UK, Leiden and Rotterdam (Netherlands) and Oulu – Finland. Each council's network had distinctive features which reflected the political and business opportunities of their respective communities. Not a case of one size fits all.

Model 1 - Council owned and operated municipal Wi-Fi networks.

These networks were robust, with wide coverage and many uses. They were characterised by strong vision and substantial investment from the City of Fredericton, Ponca and Anderson

Model 2 - Council owned and privately operated

Examples are the City of Rotterdam and Oulu that rely on support from expert consultants and research centres to establish their free community network.

Model 3 - Council facilitated but privately owned and facilitated

The cities of Auckland, Swindon, and Albany all have established public-private business relationships with private providers that support limited free internet access in exchange for commercial leveraging from the respective councils

Model 4 - Council facilitated but community owned and operated

Leiden Wireless is a unique example of a service established by a group of professional volunteers and autonomously owned and operated by a community foundation. The council provides assistance to the volunteers.

In the last decade hundreds of councils across the world have established and sustained municipal Wi-Fi networks for the benefit of their residents. Some major cities (e.g. San Francisco) have had spectacular failures with municipal Wi-Fi projects while many smaller and medium sized cities have quietly and successfully deployed and maintained municipal wireless networks.

How they work

Municipal Wi-Fi networks use a free frequency band not subject to government restrictions or license fees with the ultimate aim of making wireless access to the internet a universal service. It works by deploying a wireless mesh network, (i.e. interconnected nodes or antennas that act as access points for Wi-Fi laptops, PDA or desk tops) attached usually to light poles or public and private buildings, across a city area. The antennas are powered by electricity and the internet is sourced via a backhaul or pathway point.

Coverage

The extent of the coverage varies greatly. Some councils have blanketed the whole city, making internet outdoor access available almost everywhere. Other have limited their municipal Wi-Fi networks to CBD, business activity corridors or frequented open spaces for free public use.

Main Issues for Victorian Local Councils

Nearly all Victorian councils have passed over this wireless development because it is generally not seen as the domain of local government, especially with the promise of the National Broadband Network. Should local councils get into this space? This is a fair question that needs to be tackled right at the outset.

Simply put, municipal Wi-Fi networks should be seen as a standard municipal service. Big infrastructure projects of the past connected cities, facilitating economic activity and made them liveable and attractive. Communication and internet infrastructure at the local level should be viewed in the same way.
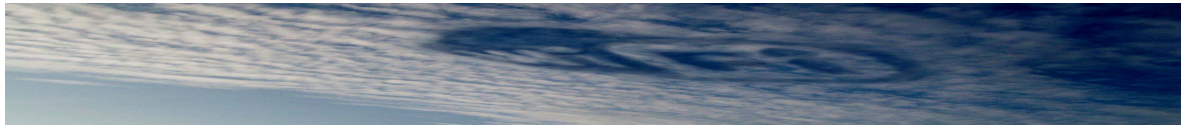
5.   INTRODUCTION

'Five Weeks Nine Cities'

The main objective of this study tour was to undertake overseas research on municipal Wi-Fi networks and survey what models best suit Victorian local government.

After much preliminary research and many conversations with a range of experts in wireless networks and technologies both in Australia and overseas, medium to small cities were selected which were comparable to Darebin and similar Victorian councils. These are cities where municipal Wi-Fi networks have proven to be most successful. As a result the study focused on nine medium-sized cities (see below) across North America, Europe and New Zealand, which were visited in May 2010.

- o   Auckland – New Zealand
- o   Ponca – United States
- o   Anderson – United States
- o   Albany – United States
- o   Fredericton – Canada
- o   Swindon – United Kingdom
- o   Leiden – Netherlands
- o   Rotterdam – Netherlands
- o   Oulu – Finland

Each of these cities has gained a solid reputation in the provision of Wi-Fi service to its residents and some have even received international recognition as 'smart cities" of the 21st century.

6.   BACKGROUND

What is a municipal wireless network?

Municipal wireless network is a way of turning an entire city into a wireless access zone with the ultimate goal of making wireless access to the internet a universal service. Councils often take a phased approach, starting with one or a few sectors of a city to demonstrate competence before making the larger investment of attempting full coverage of a city. Many councils limit the Wi-Fi network to activity centres and frequented open spaces.

The expenses of a Wi-Fi network can be minimal, partly because no license costs have to be paid for the spectrum. Wi-Fi uses a free frequency band which anybody can access.

How it works

In general a municipal Wi-Fi network is deployed by providing municipal broadband via Wi-Fi to part or all of a municipal area using a wireless mesh network. In the build-out of such mesh networks, radio communication is used both for the Wi-Fi service and for the backhaul or pathway to the Internet provider. This means that the nodes or antennas only need a wire for power (hence the habit of many municipalities of installing them on power and light poles). This all-radio approach means that nodes must be within range of each other and form a contiguous pathway back to special aggregation nodes that have more traditional access to the Internet. Nodes then relay traffic, somewhat like a fire-bucket brigade, from the laptop to the aggregation node, (see diagram below).
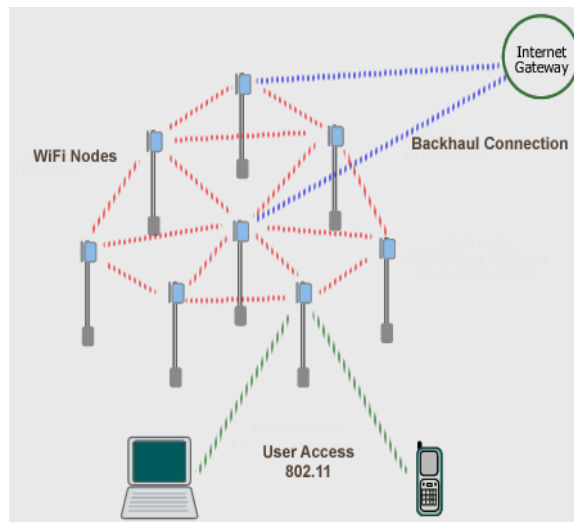
What's happening overseas?

Many cities around the world have created wireless internet networks to provide free or cheap access for their residents. Hundreds of cities in North America, Europe, Asia and even some emerging economies such as Argentina and Brazil have now established such networks (with varying degrees of coverage and success) for their communities. Some of these municipal wireless networks have effectively turned entire cities (large and small) into a single Internet 'hot zone,' while other cities have strategically scattered hotspots covering commercial and activity centres only. In fact some overseas councils go as far as accepting this as a natural municipal responsibility, like health services or street cleaning.

What's happening in Victoria?

In Victoria little has been done in this regard by the local government sector. Federation Square in the Melbourne CBD area is a Wi-Fi hot spot and recently Geelong City Council has established a hot spot zone. More and more cafes and

bars, including large fast food chain stores in Melbourne, now offer free Wi-Fi internet services to attract and retain customers.

Interestingly, the decision of key Independent MPs regarding which party they would support after the recent federal elections was largely influenced by their views on a national broadband network. In the context of the debate over national broadband, a community Wi-Fi network could play a complementary role to 21st century internet services, especially for outdoor community use.

A council-backed wireless network can be seen as a community service to those who otherwise would have no access to the internet connectivity. There are of course many other benefits, such as improved communication for the council, increased civic engagement, greater social cohesion and richer use of public space, not to mention the economic benefits to local traders and the benefits it can have for tourism. Widespread internet availability can also promote health and wellbeing, as recognised by studies supported by Vic Health[1].

A Wi-Fi network is not excessively expensive. Local governments in Victoria regularly spend hundreds of thousands of dollars on sports stadiums, community centres and IT systems. The cost of building and maintaining a modest Wi-Fi network is unlikely to be greater and could be just as important in the digital age. One of the prime reasons why some councils have provided universal municipal wireless internet service is that it costs less as a community utility.

What's happening in Darebin?

Forty-one percent of households in Darebin have no Internet access at home, often because of the expense[2]. The situation would be similar in many other Melbourne municipalities where the same 'digital divide' exists.

On the basis of this study tour Darebin Council is now exploring how a municipal Wi-Fi network could be established for residents' homes, schools, parks, public spaces and businesses. We are currently working with organisations with technical expertise in this area and plan to set up a pilot demonstration site (hot spot) in the northern end of our city by December 2010.
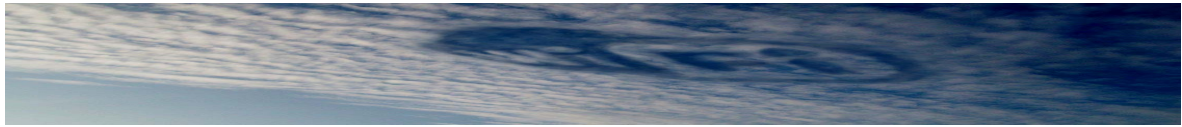
7.   WI-FI, *WI NOT?*

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[1] 'Bridging the Digital Divide' Report for the Inspire Foundation and Orygen Youth Health Research Centre, University of Melbourne.
[2] Darebin City Council – 2007 Household Survey

Is this a fair question to pose to local Councils, particularly given that Wi-Fi connectivity is not a traditional Council service like road, rubbish and community services? Why should council get into the space of providing free or low cost internet services? Isn't it the responsibility of other tiers of government? Won't the billion dollars federally funded broadband roll-out be sufficient? What benefits can Council's derive from providing greater internet connectivity to their communities?

Over the last two decades or more the internet and other digital technologies have become an integral part of everyday life, facilitating local business and community activity. Internet connectivity is increasingly important for employment, the provision of information, education, health services, social networking and community wellbeing.

Benefits and Uses

❖ *Overcoming the Digital Divide*

The digital divide refers to the gap between people with effective access to digital and information technology, and those with very limited access or none at all. It refers to a lack of physical access to technology and the resources and skills needed to effectively participate as a digital citizen.

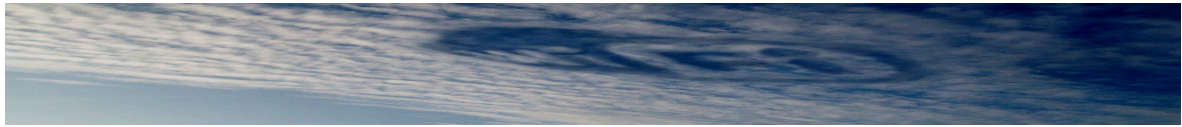The digital divide has a significant impact on the communities it affects by limiting their access to information, employment and social networks.

Affordable internet access for all members of society is a fundamental requirement of any civil and democratic society in the 21st century which espouses the idea of a fair go for all.[3]

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[3] Assessing the economic benefits of digital inclusion, Infoxchange – Atkearney, Page 4

In Darebin alone, one of the main reasons residents gave for not having internet access via a home computer was that they could not afford it. Providing more free community internet access will help bridge this divide.

❖ *Economic Development*

Organisations and businesses such as airports, hotels, restaurants and bars often provide hotspots to attract, retain or assist clients. In this way municipal wireless networks are increasingly deployed in activity centres to provide greater incentive for residents to frequent these areas.

On a larger scale, there are also plans, announced by Boris Johnson, Lord Mayor of London, to give all of London wireless internet access. The aim is to have blanket Wi-Fi coverage by the time of the 2012 Olympics. In the Mayor's words, 'every lamppost and every bus stop will, one day very soon and before the 2012 Olympics, be Wi-Fi enabled'.[4]

Just across the Tasman the Auckland City Council wants to deploy a municipal Wi-Fi network in large parts of the city in time for the Rugby World Tournament and the expected influx of tourists.
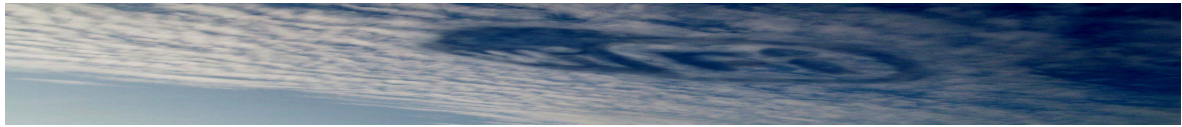
The City of Fredericton in New Brunswick, Canada, has integrated traditional and wireless technologies to create Fred-eZone, a free, community-wide Wi-Fi network providing residents, visitors and businesses with mobile broadband access from virtually anywhere within the city. This project was conceived in terms of economic benefit, as the network enables the City of Fredericton to better differentiate itself from other cities and towns. This should increase its ability to attract and retain 'knowledge industries' looking for a location that offers an innovative and productive environment.

Tourist photographed using city internet in an Auckland café

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[4] London Evening Standard, Monday 24 may 2010 Page 2

❖ *Overseas experience of Council uses*

In the United States and Canada the deployment of municipal wireless networks has mainly been motivated by the prospect of greater efficiency. This has occurred principally in the areas of meter reading, access to city applications to enable working from home or in the field, public safety and video surveillance, traffic management real time weather readers and police and emergency services. Cities have then used excess Wi-Fi capacity or a range of other services that will improve quality of life and city services, (see illustration below).
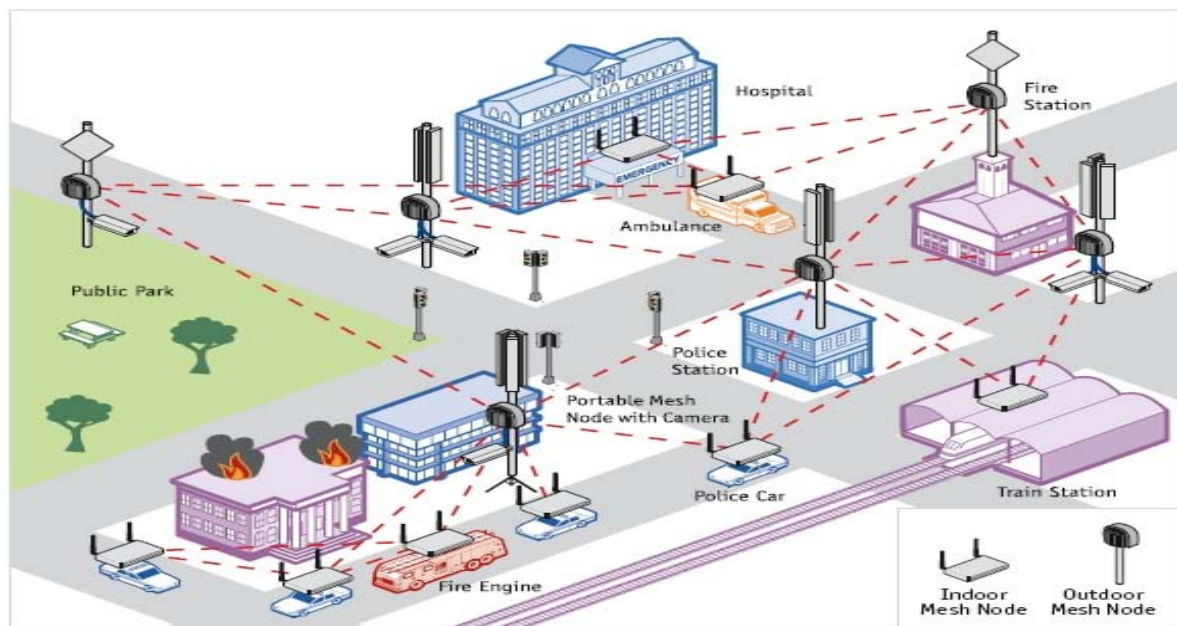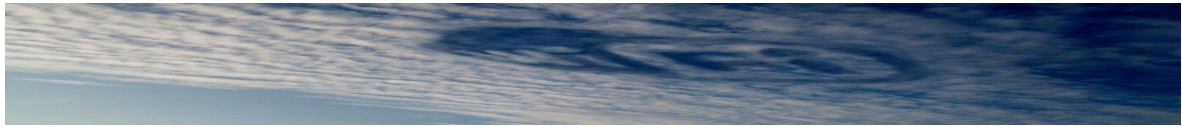

In Europe, on the other hand, the focus of local governments has been more on liveability, utilisation of open space and communal cohesion. There are European city councils that see providing residents and city visitors, especially students, with a cheap and easy way to get on-line as being an essential utility like water or electricity.

8. BUSINESS MODELS FOR MUNICIPAL WI-FI NETWORKS

It is necessary to find a business model that will sustain a municipal Wi-Fi network in the long term. It is important to note that councils providing free Wi-Fi use different business models in accordance with local opportunities and conditions. One key determinant is how the wireless city network fits in with the overall policy objectives of a city. Another is how it suits the objectives of the local firms and research organisations as potential partners in Wi-Fi. Attention must also be paid to government support and grants.

In the following section I will examine four business models. Each of the nine cities with municipal Wi-Fi networks that I visited falls within one of these models and I will provide details of how each city has deployed and successfully maintained its municipal Wi-Fi network.

Model 1 - Council owned and operated municipal Wi-Fi networks

Under this business model local councils both own and operate their municipal networks. The extent of investment depends on the objectives of the project and the level of city coverage. This business model exposes councils to greater financial risk, as they are funded using city resources alone. However, the Wi-Fi networks are predominately used for core operational activities rather than internet access alone. In fact, community internet access is generally a by-product of the wireless network. Below are three examples of Councils that have funded their Wi-Fi networks using city revenues.
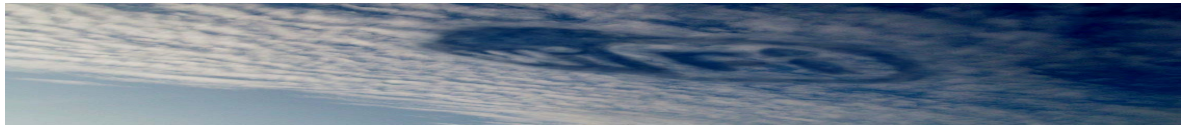
City of Fredericton (Canada)

❖ **About the City**

The City of Fredericton is the capital city of New Brunswick, located in the Atlantic Provinces of Eastern Canada. The province of New Brunswick borders the State of Maine (US). The greater Fredericton area has a population of 85,000. Fredericton is a scenic and leafy city, with the Saint John River running through it. There is very little manufacturing, and the economic base consists primarily of the IT sector, e-learning, research and development, two university campuses and government administration. The student population expands the population in Fredericton during the school year by approximately 12,000.

Mayor Brad Woodside

❖ **Canada's first wireless city**

Fredericton is the undisputed Canadian municipal leader in the field of municipal Wi-Fi networks, having the honour of being the first wireless city. It identified the need to develop community wireless connectivity back in 1999. The Council did not accept the idea the first time around, but then used it for the benefit of planning and investment. The network gives Fredericton a point of difference which helps to draw in those engaged in the knowledge industries.

❖ **Objectives**

Fredericton now prides itself on being a 'smart community' and was nominated one of the top seven Intelligent Communities[5] a few years ago. As such the municipality has recognised the importance of high-speed low cost broadband. The broadband market in Fredericton was a duopoly which resulted in prices relatively higher than those in neighbouring major centres such as Halifax, Montreal and Boston. The municipality therefore decided to become its own non-dominant carrier and created a not-for-profit company called 'e-Novations,' whose mandate is to bring high-speed low cost network to the city for government, business and Institutional use. The result has been to bring the price of bandwidth from the highest in Eastern Canada to one similar to or lower than the price in other major cities along the Atlantic seaboard.
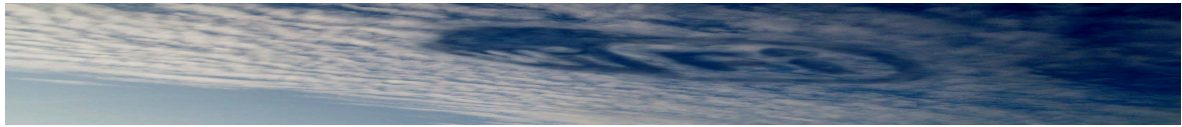
❖ **'Fred-eZone'**

The shift to a wireless network released enough excess capacity to provide the city with free internet access. Fred-eZone was launched in 2003 in the main business corridors, and is now a free Wi-Fi network provided by the City of Fredericton. Anyone with a laptop, PDA or desktop computer can surf the Internet, check email, etc. from any of a number of areas. Fred-eZone covers virtually the entire central business district, with over 100 access points in parks, arenas, hotels and shopping centres. The network is city owned and nodes are placed on council water towers, roof tops, traffic signals and street poles. The city has plans to expand coverage to all business districts and public spaces in the near future.

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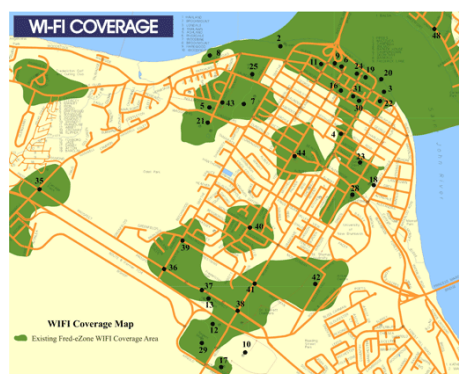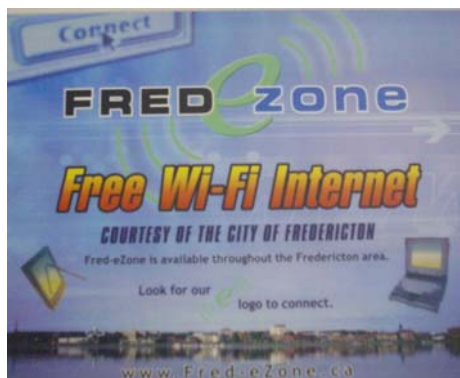
[5] Intelligent Community Forum , NYC

❖ **Usage and Monitoring**

Usage is free and unlimited and there are about 500 single or individual users per day. Overall there are about 2,000 multi-users or 'tap-ins' per day. The network is monitored by council staff. The service and administrative demands on the network by residents are negligible.

PONCA CITY (OKLAHOMA) United States of America

❖ **About the City**

Ponca City is has a population of approximately 26,000 people, of whom 77% belong to the white and non-Hispanic community. The town was named after the Ponca Tribe and has an unusual history. While agriculture and water are important resources, Ponca City history has been shaped for the most part by the ebb and flow of the petroleum industry since it began in 1911. Based in Houston, Texas, ConocoPhillips continues to operate one of the United States' largest refineries in Ponca City. The company's presence is much smaller than it once was, and Ponca City's population has declined steadily since the early 1990s as a result. In February 2009, ConocoPhillips announced that all of its remaining non-refinery operations in Ponca City (representing 750 jobs) would be moved out. Recent efforts to expand the city's economy beyond the petroleum industry, however, have created a number of technology, manufacturing and service jobs.
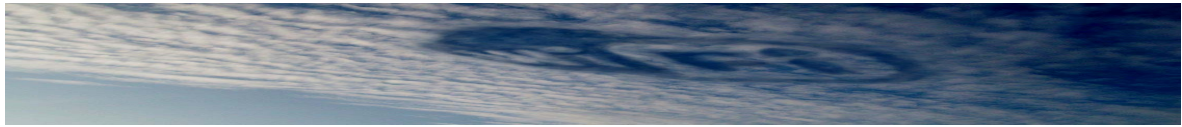

L-R from the City of Ponca City
Craige Baird, Tech Services Director
Homer Nicholson, Mayor
(Gaetano Greco, City of Darebin)
Craig Stephenson, City Manager
City of Ponca City

❖ **"Ponca Wireless City"**

Ponca City has built its own municipal wireless network and has installed 120 miles of fibre optic cable in last 7 years. It now provides broadband to most major industries and the local hospital. The city-owned infrastructure now supports mobile public safety and video surveillance, and the enhanced service reduces operating costs for the city. The city has plans for 1,000 square miles of mesh network coverage. It currently runs a dual system with separate bands for public and private access.

The intention is to use the network for a range of services that will improve quality of life and city services.

❖ **Reasons for use**

The council found that 75% of city staff perform duties outside an office. As a result the wireless network was developed as an important tool to support all city departments and employees.

It is used, for example, to read water meters and for off-site planning and building field inspection, giving workers access to the same information in the field as in their office. It also reduces drive time and costs as more work gets done without the need to return to the office.

Public safety is another important use. Emergency vehicles have mobile antennas giving immediate access to critical information. Police can spend more time in the field and can monitor a larger area. They no longer need to return to the station to file reports.

❖ **Usage and Monitoring**

Ponca City's wireless network covers 60 square miles of the city and surrounding area. All Ponca City residents were given 2.5 Mb free internet access from anywhere in the city. Recently it was increased to 15 Mb.
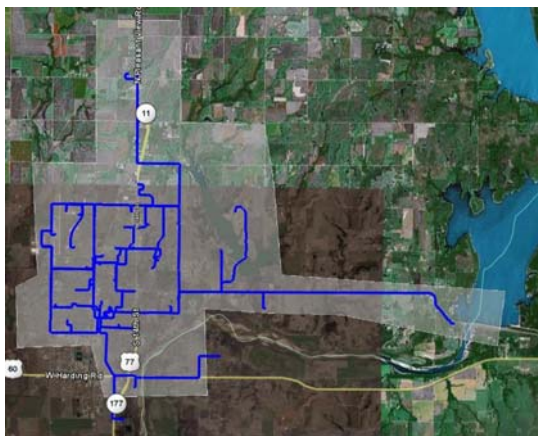
**60sq miles wireless mesh overage**
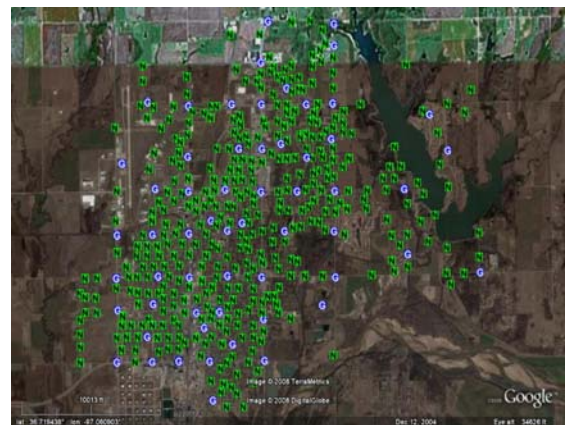
Network Overview Map

Over time it was shown that the mesh network performance exceeded expectations and project requirements. As a result the Mayor and administrators approved use by residents, returning unused capacity to the community who paid for the network. There are now about 4,000 unique individual users per day, with 100 new users per week.

While the service may be free to residents they still expect the support they would get from a service they pay for. For example:

- o In-home installation
- o 24 hour hotline
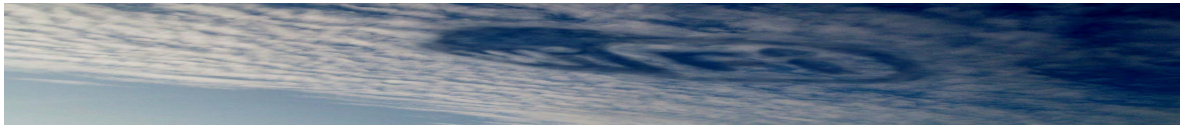
- Web page for technical support
- Computer trouble shooting
- Immediate repair of faulty antenna radios (nodes)

Plans for a 1,000 square mile mesh network have been developed and towers are being upgraded now to reach remote locations, as these remote residents expect to get the same internet service as those within city limits.

City of Anderson (Indiana) – United States of America

❖ **About the City**

Anderson is a city in Madison County, Indiana, United States, and is part of the wider Indianapolis metropolitan area. The city has a population of about 58,000 which has been declining over recent years, and covers an area of about 40 square miles.
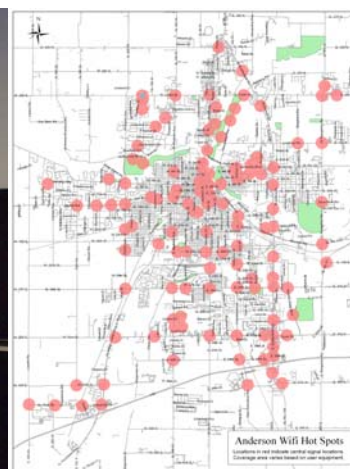
❖ **"AndersonWifi"**

AndersonWifi is a wireless Wi-Fi internet signal that is transmitted in various locations around the city. The free Internet hotspot service is provided by the City of Anderson as a public service. It is not intended to be used in homes or as a replacement for residential Internet services like cable or DSL.

❖ **Council rationale and drivers**

The free internet service is essentially a by-product of a municipal communication system that was put in place for its Automatic Meter Reading project, as in Ponca City. Staff emphasised that, while the community can use the signal, the network was not set up for use by residents either at home or externally.
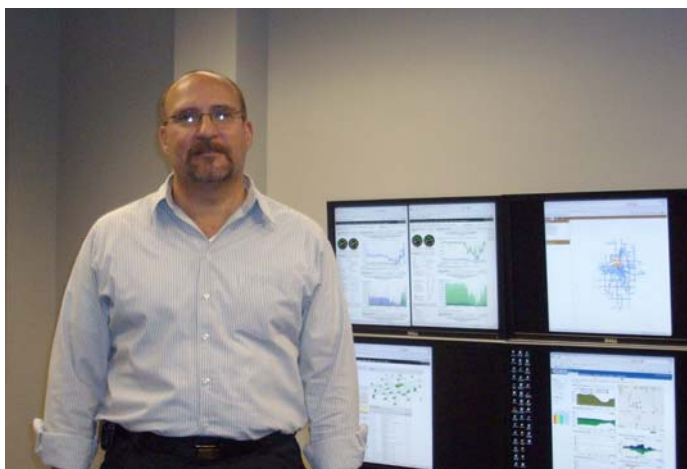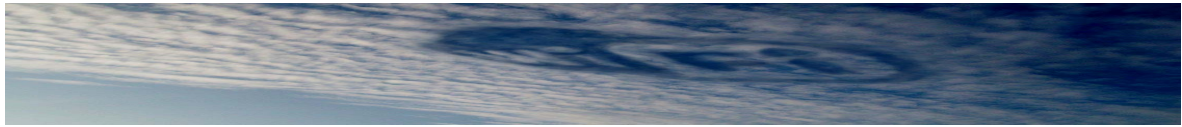

Darren Grile, IT Manager, City of Anderson   Anderson Wi-Fi Hot spots

❖ **Usage and Monitoring**

AndersonWifi is a series of hot spots across the city, and does not cover the whole 40 square miles of the city. The hot spots were determined according to the Automatic Meter Reading project. Homes near these hotspots therefore have good reception and accessibility to the internet. So as not to inflate residents' expectations, the city administration does not overly promote the network.

Because the service is free there is limited funding for internet bandwidth. As a result, excessive file sharing and video downloading tend to make the service slow for other users. Staff monitor the network, and have the ability to limit excessive use or block users from the network altogether.

Staff also try to block pornographic sites but this can be difficult with so much content being added to the internet daily. The City recommends that parents monitor their children's use or use software that helps block undesirable sites.

In total there are about 2,000 single users per day for the free unlimited service.
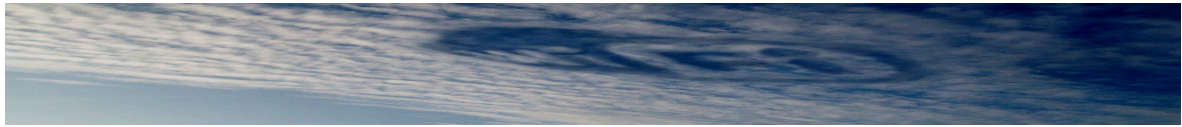

Model 2 - Council owned and privately operated

This business model exposes councils to less financial risk but requires an IT business partner. The private partners provide a basic free service supported by a full commercial paid-up internet subscription service. In return, councils help to facilitate the provider's access to council infrastructure (electricity, light poles, rooftops of council buildings, etc.) and with marketing. The private operators usually own and run the service, and deal with the resident users.

City of Rotterdam Netherlands

❖ **About the City**

Rotterdam is a city in the Dutch province of South Holland, situated in the west of the Netherlands. The municipality is the second largest in the country, with a population of just over 600,000 as of March 2010. Rotterdam is essentially a port city and the port of Rotterdam is the largest in Europe. From 1962 to 2004 it was the world's busiest port, until it was surpassed by Shanghai.

❖ *"Rotterdam Wireless"*

This is a two year Wi-Fi pilot project in the city centre to provide a series of outdoor hot spots for public internet use. It will cover an area of one square km in the CBD area. The network will consist of 32 mesh nodes with 2 internet gateway nodes connected to fibre. The fibre backhaul nodes will connect to Rotterdam Internet Exchange for internet connectivity. The total allocated for the project is 300,000 Euros and a private contractor has been charged with developing, installing and servicing the Wi-Fi network.
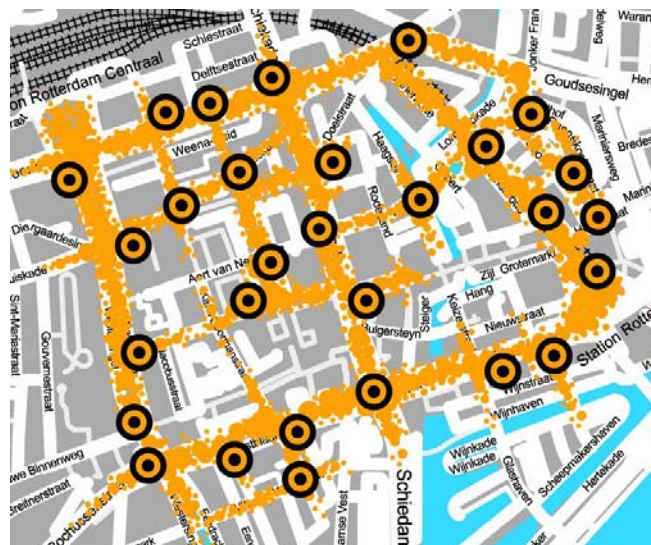
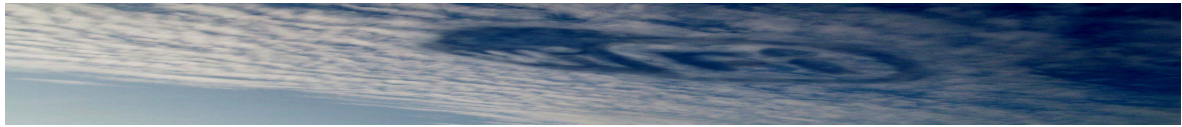**Coverage of CBD area in Rotterdam**

❖ **Objectives**

Rotterdam Council's main objectives are to improve:
- Business opportunities
- Employment
- The city's image
- Access to municipal websites
- Internet access to council facilities e.g. the museum and open spaces
- Internet access for open air festivals and events

Consultant Leo Homus, Director Riverconnect, Rotterdam

❖ **Usage and Monitoring**

The network is not yet fully operational. The proposed free Wi-Fi service will be for external use, serving mostly to enhance the city's reputation for innovation.

City of Oulu – Finland

❖ **About the City**

Oulu is the largest city in northern Finland and the sixth largest in Finland. It is about 600km north of Helsinki. The population of the Oulu region as at January 2009 was about 220,000 people, and the population of the city itself is about 140,000. The average age of people living in Oulu is 36.7 years, as it has a student population of about 25,000. There are about 6,000 companies and 70,000 jobs in the city. Traditionally Oulu was notable for pulp and paper manufacturing, chemicals plants, wood and metal working and construction and logistics. These still exist but have lost importance, and new industries have emerged, i.e. Information and Communication Technology (e.g. Nokia), content production, media, wellbeing services, biotechnology and environmental technology.
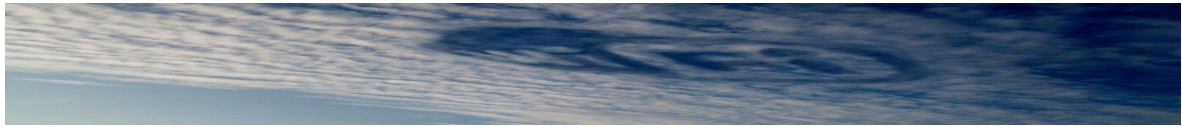
❖ ***"panOulu - Open Citizen's Network"***

The wireless panOULU network was set up in 2005 and is accessible free of charge. It can be used with a WLAN compatible laptop, PDA or mobile phone. The panOULU network covers areas such as the market square, downtown Oulu, the city library and many other public facilities with over 1,100 access points. The network has thousands of users and provides wireless broadband Internet access to residents and visitors.

The panOULU network is provided in cooperation by City of Oulu, University of Oulu, Oulu Polytechnic and other local research and development organisations. To use the network no username or password are necessary**.** PanOULU does not compete with commercial services. It does not offer extensive user support nor the same reliability that commercial operators provide.

Professor Timo Ojala, University of Oulu, (Left)
Dr Michele Nati, University of Surrey (Ctr)

❖ **Objectives**

The city aims to utilise information and communication technology that best improves the city's services, and promotes e-services at the local government level. The City of Oulu has forged close links with many of the local universities and organisations like Nokia that carry out information and communication technology research and development.

❖ **Usage and Monitoring**

 Approximately 20,000 users per month

Model 3 - Council facilitated – privately owned and operated

In this model councils enter into public-private commercial arrangements with communication and technology companies. Council merely plays the role of facilitator. The network is usually owned by the private partner, who designs, markets, promotes, maintains and runs the service.

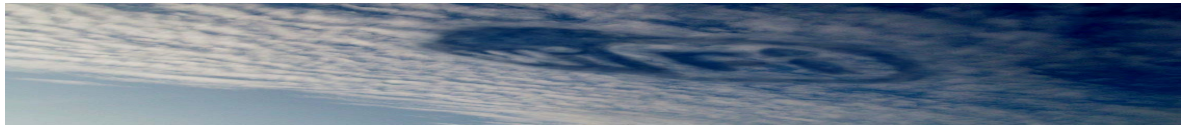## Auckland City Council – New Zealand

❖ **About the City**

Auckland is the economic gateway to New Zealand with a population of about 430,000 people, representing about a third of the national population.

The role of Auckland City Council, clearly defined at the inception of the project, is merely to facilitate the development of the wireless infrastructure. Therefore it does not seek to own, operate, install or build the network. Instead it has assisted private partners by providing:

o Use of council owned infrastructure and buildings
o Power supply
o Potential contribution in kind
o A neutral broker and facilitator role for access to non-council infrastructure
o Marketing, promotion and advocacy
o

❖ **"Auckland City Wi-Fi"**

Auckland is the first city in New Zealand to launch a comprehensive Wi-Fi service. It was launched in February 2009 in eight hot zones throughout the CBD area of Auckland and fringe.

The service enables tourists, students, business people, and residents to access the internet quickly to check the emails, watch video content such as YouTube or communicate with programs such as Skype.
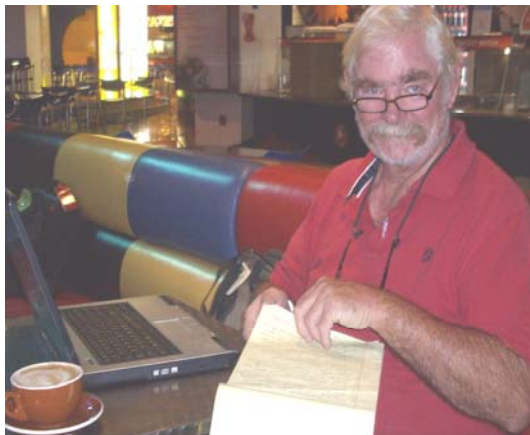

Visiting yachtsman in an Auckland Wi-Fi zone

Rates to use the pay-as-you-go service are $3 per hour, $6.50 per day or $30 per week. Access to Auckland city information is also available but is free of charge. These tariffs compare favourably with hotels and serviced apartments (average $29 per day) and expensive cellular network services.

Auckland City Council has been able to provide fast affordable Wi-Fi service through a partnership with Kordia, one of New Zealand's leading providers of telecommunications and network services, and Tomizone, Australasia's largest provider of Wi-Fi services.

Over 250 routers were installed in businesses, restaurants, shops and popular places in the hot zones to complement the outdoor coverage, currently consisting of 150 nodes.
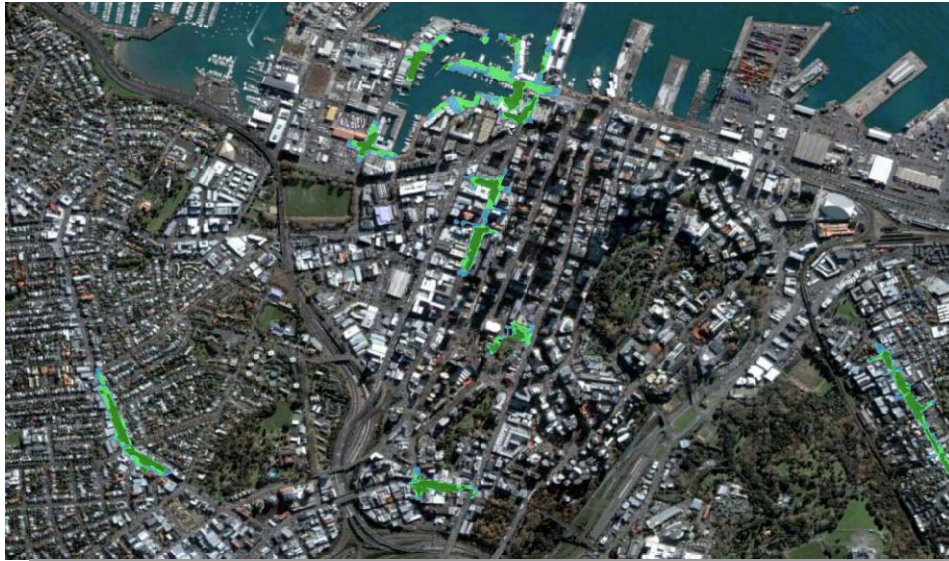
Auckland City Wi-Fi coverage area

❖ **Council rationale and drivers**

The following were identified as the main objectives for the wireless project:

- o Increase accessibility to broadband
- o Increased use of the CBD outdoor public spaces
- o Minimal intervention in the market
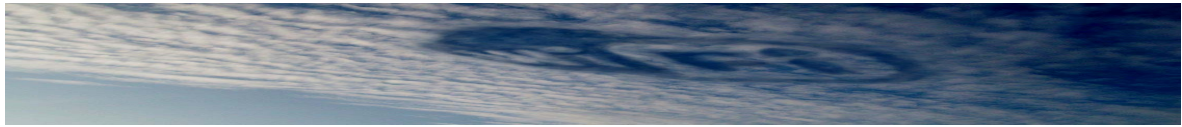- o Broadband affordability
- o Economic development

Since the launch in 2009 Auckland City Council's analysis has demonstrated:

- o A public desire for the expansion of Wi-Fi
- o Significant benefits to tourism, including the Rugby World Cup 2011, and to municipal applications, e.g. CCTV, from the expansion of Wi-Fi
- o Substantial possible improvements in terms of quality and coverage

❖ *Usage and Monitoring*

On the 16 September 2010 a major expansion of city Wi-Fi was proposed by Auckland City Council in time for the Rugby World Cup in 2011. The proposal aims for coverage in 732 sites in 62 locations, compared to the 150 nodes currently in place. With council's current service, all revenue flows to private sector partners. Under the proposed expanded service, council will look to develop a profit-sharing arrangement with a retail partner.

The network is monitored by one of the private Wi-Fi partners, Tomizone. They provide technical help and billing, and deal with clients.
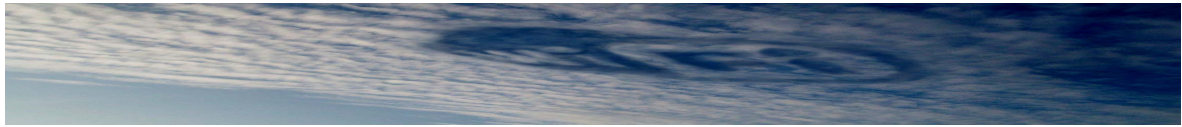
Swindon Borough Council – United Kingdom

❖ **About the City**

The Borough of Swindon is in the south-west England (between Bristol and London) and has a population of about 186,000 people. It is one of the fastest growing towns in the UK and has a very low unemployment rate. It is in the top 10% of Britain's local authorities and districts for economic activity.
The town, home to a number of high-tech businesses, already has the country's highest broadband usage.

❖ Council rationale and drivers

Swindon plans to become Britain's first Wi-Fi town, and to give free (time limited) internet access to residents. The Swindon network, called Signal, will install a matrix of 1,400 high-powered routers on top of light poles to create a Wi-Fi mesh across the town accessible to anyone with a wireless-enabled computer.

The project is expected to cost £1 million and is jointly funded by the council and two private partners, each having around a one third share. Together they have formed Digital City UK, a holding company. Council funding is in the form of interest-bearing loans to the holding company.

The private companies will recoup their investment by charging subscriptions for extended access and broadband packages. The council will receive a share of the revenue as well as part of the proceeds if, as hoped, the technology is adopted by other communities in Britain.

I interviewed Mr. Rikki Hunt, the businessman who set up the public-private scheme. He said that they have already had expressions of interest in the model from several towns in the south west. But first he wants to prove in Swindon itself that it works.

Rikki Hunt, CEO, Digital City (Signal) UK Ltd and
Cllor. Roderick Bluh, Leader of the Council and the Conservative Group
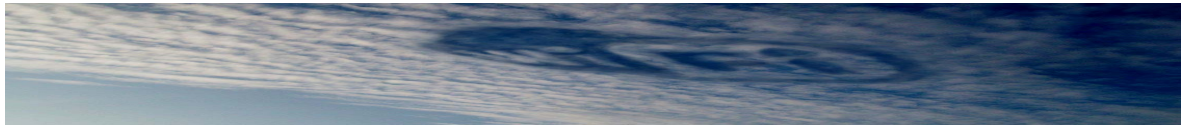
❖ **"Signal Free" Network**

The wireless mesh network has been rolled out in the historic centre of Highworth Village, consisting of 3,800 homes. These residents have access to free internet access at 20Mb download speed for up to two hours per day anywhere in the village. If users want unlimited internet access they are encouraged to subscribe to a paid service costing significantly less per month than anything offered by major broadband operators.

As radio signals do not travel well through brick and concrete, users are given wireless repeaters that can be installed in windows to boost the signal around homes. This is to make sure users get a fast enough connection for high definition TV, video-on-demand and business-critical data applications, (see illustration below).
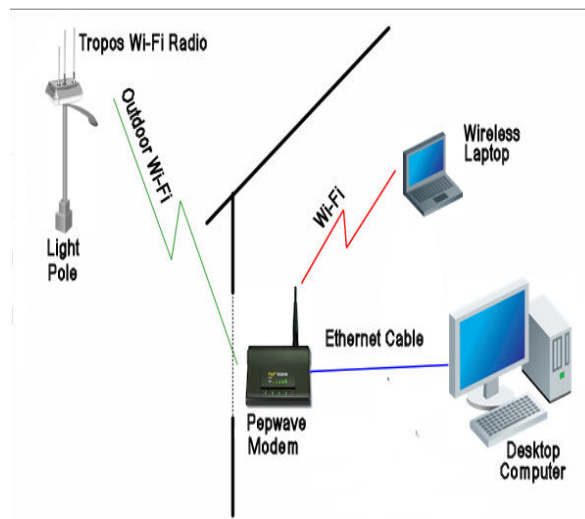
❖ **Usage and Monitoring**

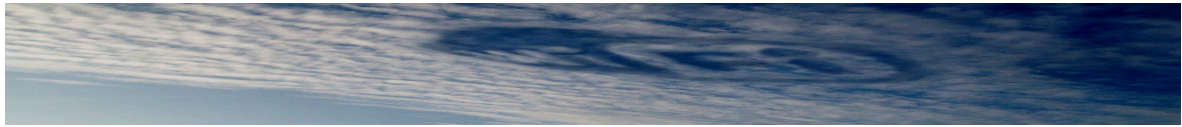Currently there are 500 users per day for both home and outdoor use.

City of Albany (New York State) – United States of America

❖ **About the City**

Albany is the capital city of the U.S. state of New York. The city has an estimated population of about 93,000. Albany is the second oldest chartered city in the United States, and has been a center of higher education for over a century, with much of the remainder of its economy dependent on state government and health-care services.

The city experienced a decline in the 1970s and 1980s, with huge declines in manufacturing trades, retail and construction. Albany is known for its history,

culture, architecture, and institutions of higher education, but poverty is prevalent. 25% of all families live below the poverty line and 10% of residents live in extreme poverty with incomes less than 50% of the federal poverty level.

❖ **"Albany FreeNet"**

Albany FreeNet is a free wireless internet access network for downtown residents, visitors and business people. It came about as a result of a grant from the New York State Department of Economic Development and a matching contribution of $200,000 in equipment, bandwidth and manpower from Tech Valley Communications, Albany's only locally owned and operated telco firm.

Albany FreeNet was launched in late 2006 as a public/private partnership between the City of Albany and Tech Valley Communications. Initially it provided users in the CBD business corridor one hour of free wireless internet connectivity each day for each computer. With more government grants the service was extended to neighbourhoods in the city where internet adoption rates are lowest.

This expansion included free digital literacy training programs and virtual workforce development programs, accessible via the Albany FreeNet captive portal. The project has also made available highly subsidised desktop computers for those who cannot afford them.
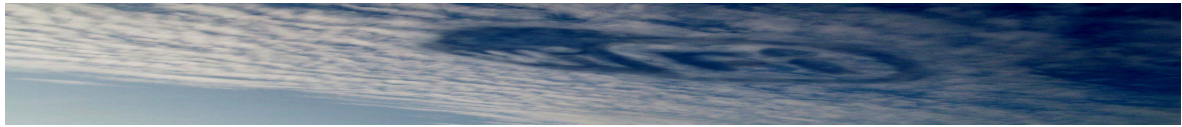
There is now no limit on how long users can use Albany FreeNet, though there is a 200MB daily data limit. Users can sign on as many times as they like twenty-four hours a day until the total data usage (downloads and uploads) on Albany FreeNet for that day reaches 200MB.

Tech Valley Communications also offers a premium wireless Internet service called Wink High Speed Internet that provides users with faster connection speeds and more features. Wink High Speed Internet subscriptions help subsidise the free Internet service for free users in the City neighbourhoods where Internet adoption is lowest.

Jeff Mirel, Director, Wireless Services, Tech Valley Communications

As part of the deal the city allowed Tech Valley to install over 100 wireless access points on municipal buildings and facilities to provide for a larger coverage.

❖ **Objectives**

Albany City is working to break down the digital divide by providing broader access to fast and affordable internet services and by expanding digital literacy programs. The wireless network will also support applications to enhance public safety and streamline city services.

Tech Valley Communications benefits from council advertising via the free internet service to promote its subscription service, and provides in return a sustainable business model for a wireless network with universal free coverage. This is especially advantageous to the city given the level of poverty.

❖ **Usage and Monitoring**

There are about 3,000 users per month.

The design, deployment and upkeep of the wireless network is managed by the private partner, Tech Valley Communications.

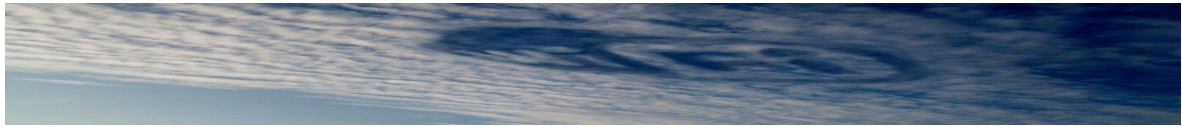**Model 4 Council facilitated – Community Owned**

This is a unique business or rather community model, being essentially driven by community interest and professional volunteers. I have only been able to identify two community-owned wireless networks, one in Holland and the other in Finland.

City of Leiden - Netherlands

❖ **About the City**

Leiden is a city and municipality in the Dutch province of South Holland. Its has a population of about 118,000 people. Leiden is located on the Old Rhine, some 20 kilometers from The Hague and 40 kilometers from Amsterdam in its North. A university town since 1575, the city is also famous for its historical almshouses and museums, and is the place where Rembrandt was born.

❖ Wireless Leiden

The Wireless Leiden Foundation, established in 2002, has set up an open, inexpensive, fast wireless network for Leiden and surrounding villages. It is an independent network which links up to the Internet, but can also be used for free local communication within the Leiden region.

Wireless Leiden is a non-profit organisation, operated by a group of professional volunteers who deploy and service the wireless infrastructure. They have experience and knowledge in a range of disciplines, like radio technology, network planning, innovation management and public relations, and form the core of Wireless Leiden.
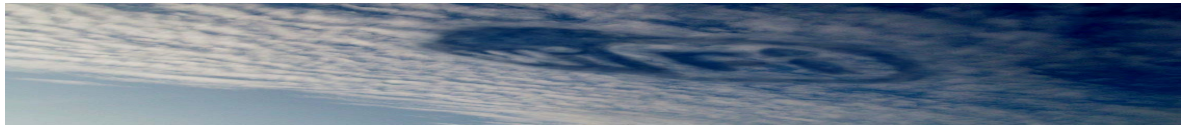

Welcome to Wireless Leiden

Almost all expenses are for hardware and nodes. The costs of maintaining the network mainly relate to the purchase and maintenance of the hardware. Wireless Leiden does not receive subsidies and is fully dependent on major sponsors and donations. The Foundation has been successful in securing different organisations to pay for the 100 or more nodes scattered on city buildings and schools in exchange for naming the node after them.

To assist users the volunteers run a once-a-week walk-in consultancy hour. Users can also send a message via the mailing list for help.

Wireless Leiden is not an internet provider and recommends those that can afford paid internet services to use them, as they are usually faster and more reliable. That way the free Wireless Leiden service can remain available for those who cannot get a fixed connection or need a connection temporarily (e.g. when moving house or in case of a problem with their own connection), tourists and business visitors, and for use outdoors.

Wireless Leiden now reaches out to small surrounding villages where there is no fast internet connection.

A Wi-Fi enabled laptop or PDA can be used without any additional equipment. An outside antenna or USB-adapter, however, is usually needed to get indoor reception.

❖ **Usage and Monitoring**

Huub Schuurmans, Founding member of Wireless Leiden

There are about 3,000 constant users of the service, which is monitored by a dedicated group of volunteers.
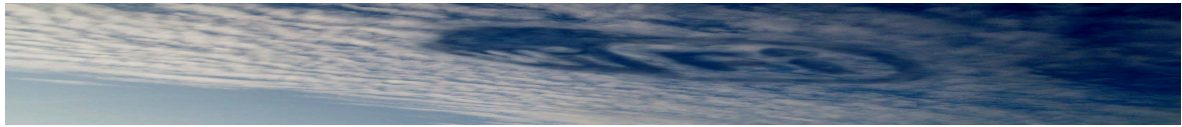
9. MAIN ISSUES FOR VICTORIAN COUNCILS

Political commitment

Councils must show political will and vision.

Manage community expectations

This is absolutely crucial since as most municipal Wi-Fi networks are limited and designed for outdoor use only. Most examples I saw were not intended for indoor use unless they were supplemented at the user's costs with retrievers or boosters. The scope and installation of the network should be carefully planned and communicated to residents so as to avoid unrealistic expectations.

Must be free and user friendly

A municipal wireless network should be free and very user friendly and provide enough bandwidth to sustain moderate traffic at acceptable speeds.

Unsecured network

Like the internet services one finds in cafes and fast food outlets, it should be unsecured, requiring no user identification. From a public security perspective users can still be identified only via the identification numbers of the computers. It should be accepted that councils should NOT be responsible for the behavior of network users, similar to the situation on a telephone network where the operator is not responsible for what users are doing.

Objective advice

It is important that councils seek objective technical and practical advice. .

Pilot Demonstration sites

The best and surest way to establish a network is to start small with a demonstration pilot site in a busy area.

Health concerns

The Wi-Fi radio waves have extremely low power (the amount of milliwatt emissions is far less than that of a mobile phone) and in addition the access points are dispersed and outdoors. Therefore the signal is hardly detectable inside homes (a reason why boosters are needed for indoor use). The technology that is usually used is identical to the one that people use at home or office for a local wireless network, e.g. to connect to the internet modem/router. Similar wireless signals are also used in hospitals.
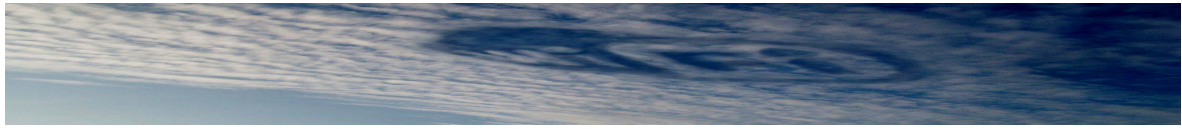
10. LESSONS

Two of the biggest lessons that Victorian local governments can take away from municipal Wi-Fi projects currently under way are:

1. clear mission and articulated case for building a wireless network

2. business model for building and sustaining the network.

Cities that have seen early success have been able to articulate very clearly to councillors and residents how the network will be used and how it will benefit people. And they've also had clear business plans for paying for the networks.

11. CONCLUSION

In Victoria municipal Wi-Fi networks have the real potential to complement the National Broadband Network currently being rolled out by the federal government across Australia. The new optic fibre network will bring many Victorians further into the 21st century by enabling more people to have access to fast broadband internet services from their home or businesses.

This will only increase people's appetite for greater outdoor internet connectivity in parks, cafes, public places and activity centres at the local level. In the next decade local councils could play an important role in connecting their communities by establishing community free hot zones off the back of the NBN at relatively low cost. For many Victorian local governments today Wi-Fi may not seem like ordinary council business, but as other cities, both big and small have shown, councils need to embrace this opportunity.

21ST COUNCIL INFRASTRUCTURE

"*LIKE THE STREETS, WALKING TRAILS, PARKS, SWIMMING POOLS AND SPORTS FIELDS, WIRELESS INTERNET IS MUNICIPAL INFRASTRUCTURE*"

FREDERICTON COUNCIL CANADA

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12. REFERENCES AND ADDITIONAL INFORMATION

BACKGROUND INFORMATION

❖ MAV Application

MAV_Fellowship_Application.zip

❖ Power point presentation, Municipal Wi-Fi Networks for MAV Councillor Development Weekend, Saturday 24 July 2010

Municipal Wifi-PPP.zip

❖ DVD presentation, Municipal Wi-Fi Networks for MAV Councillor Development Weekend, Saturday 24 July 2010. (see enclosed DVD)

MEDIA COVERAGE OVERSEAS

❖ Ponca News Article
https://webmail.darebin.vic.gov.au/owa/redir.aspx?C=9a7f8015d4c24ef993c0f80386be1996&URL=http%3a%2f%2fwww.poncacity.com%2fnews%2fdocs%2fmw%2fmw.pdf

CONFERENCES AND SEMINARS ATTENDED

❖ Intelligent Communities Forum, Building the Broadband Economy 2010 Conference (www.icfsummit.com) 20 to 21 May 2010 NY

❖ "2nd Open Ubiquitous City" Seminar, 31 May 2010 Oulu Finland, http://www.ubioulu.fi/en/2nd-Open-Ubiquitous-City-Seminar

REFERENCES
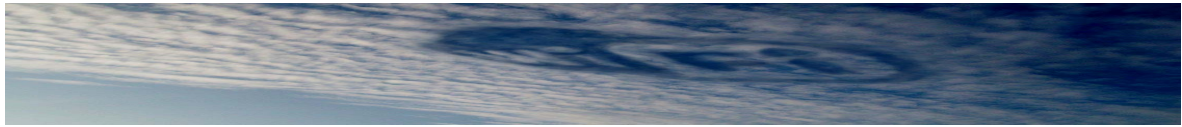
❖ Auckland City Council presentation

Tomizone Auckland City Wi-Fi .zip

❖ Tomizone presentations

Tomizone 7 Cr Greco Presentation.zip

❖ City of Ponca presentation

Ponca City WiFi.zip

❖ City of Rotterdam presentation
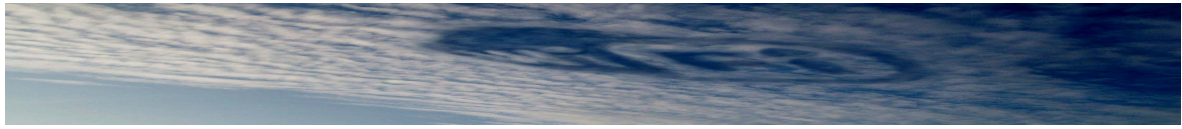

Rotterdam.zip

❖ City of Oulu presentations

City of Oulu Sec General.zip   Oulu eServices 1.6.2010.zip

❖ Professor Van Audenhoven's presentation "Business Models for Wireless City Networks in the EU and the US" presentation from an iBrussels conference in April 2009 http://ibrussels.etro.vub.ac.be/event/ibrussels-conference-workshops-urbanity-and-technology-

❖ Senator Stephen Conroy, New National Broadband Network, Joint media release, Canberra 7 April 2009

❖ Australian Government, 21st Century Broadband.

❖ Craig settles, Fighting the Good Fight for Municipal Wireless Hudson House Publishing, 2005

❖ Blanchard, M., Metcalf, A. & Burns, J.M. (2008) Young people's perspectives on taking action, 'Bridging the Digital Divide' Report for the Inspire Foundation and Orygen Youth Health Research Centre, University of Melbourne (http://www.inspire.org.au/uploads/files/pdfs/BDD%20Young%20people's%20perspectives%20on%20taking%20action_October_2008%20for%20print.pdf)

❖ Blanchard, M., Metcalf, A., Burns, J.M. (2007) Bridging the digital divide: creating opportunities for marginalised young people to get connected' Report for the Inspire Foundation and Orygen Youth Health Research Centre, University of Melbourne, Melbourne (http://www.inspire.org.au/uploads/files/pdfs/BDD%20Report%201_Yp%20use%20of%20technology%202007.pdf)
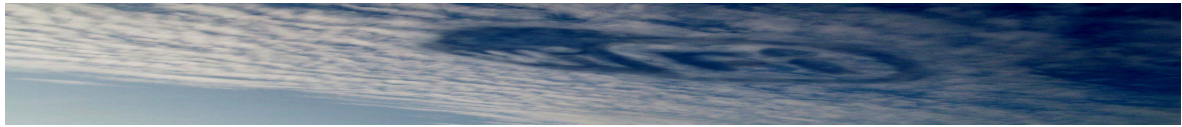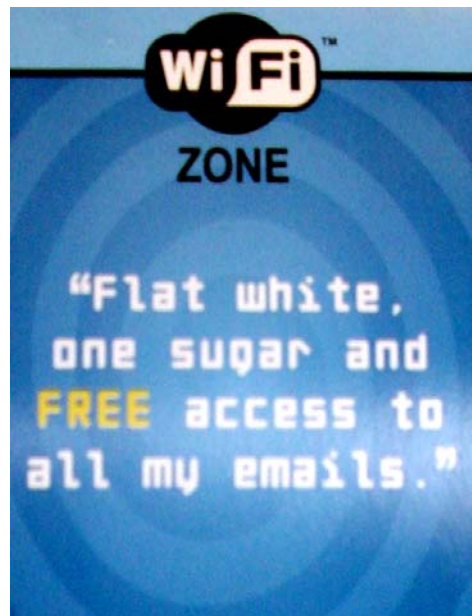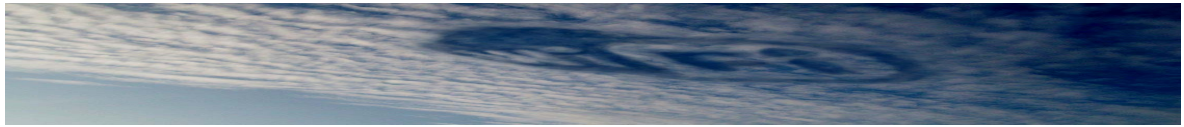
❖ **INTERVIEWS AND GROUP DISCUSSIONS**

❖ Brad Woodside, Mayor City of Fredericton

❖ Paul Stapleton, City Administrator - City of Fredericton

❖ Don Fitzgerald, Executive Director Strategic Initiative - City of Fredericton

❖ Maurice Gallant, Chief Information Office & Assistant Director Corporate Services - City of Fredericton

❖ Craig Stephenson, City Manager - City of Ponca City

❖ Craige Baird, Technology Services Director - City of Ponca City

❖ Walter Klinger, Computer Services Coordinator - City of Ponca City

❖ Homer Nicholson, Mayor - City of Ponca City

❖ Beverly Bryant, News Staff Writer - The Ponca City News

❖ Leo Homus, Director Riverconnect - Rotterdam

❖ Jill Garing, Broadband Project Manager, Economic Development - Auckland City Council

❖ Darren Grile, IT Manager, City of Anderson, OK, US

❖ Esme Vos, Founder, MuniWireless.com, www.muniwireless.com esme@muniwireless.com

❖ Cr. Aaron Bhatnagar Councillor Auckland City Council

❖ Phillip Joe, Executive Chairman, Tomizone - Auckland

❖ Steve Simms, CEO Tomizone - Auckland

❖ Emmanuel Hooson, General Manager, Sales operations, Tomizone -
❖ Auckland

❖ Michael Morrison, Metro Wi-Fi Sales Engineer, Tomizone - Auckland

❖ Cllor Roderick Bluh, Leader of the Council and the Conservative Group -
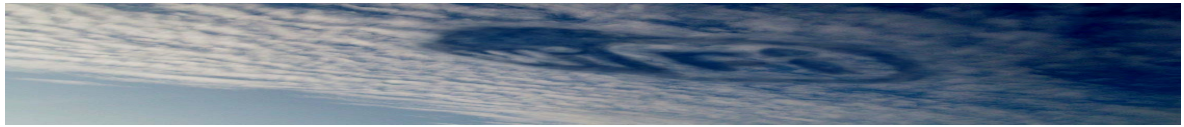❖ Swindon Borough Council

❖ Rikki Hunt, CEO, Digital City (Signal) UK Ltd - City of Swindon

❖ Gavin Jones, Chief Executive - Swindon Borough Council

❖ Jeff Mirel, Director, Wireless Services, Tech Valley Communications -
❖ Albany NY USA

❖ Drs. M. Th. (Marten) van der Plas, Policy Officer Economic Affairs -
❖ City of Leiden

❖ Kalervo Ukkola, Secretary General, Head of the City Office - City of Oulu

❖ Professor Timo Ojala, University of Oulu, Department of Electrical and
Information Engineering, Mediate am Oulu research group, Oulu, Finland

❖ Juhani Heikka, IT Manager in IT Administration - City of Oulu

❖ Dr Michele Nati, Research Fellow, University of Surrey

free wi-fi