



BACKGROUND REPORT TO WELLINGTON REGIONAL BROADBAND PLAN

TABLE OF CONTENTS

1. Current Broadband Infrastructure in the Wellington Region.....	4
1.1 Broadband in the Cities.....	4
1.2 Miramar and Petone extensions.....	4
1.3 Rural Provision.....	5
1.3.1 Wairarapa.....	5
1.3.2 Kapiti Coast/Horowhenua.....	6
1.4 Wireless Provision.....	7
1.5 Intra-regional backbone	7
1.6 Last mile/access network	8
1.7 Regional Broadband Provision Summary	8
2. Broadband and Economic Development	10
3. Broadband Technologies	13
3.1 Copper wires.....	14
3.2 Fibre optic cables	15
3.3 Wireless access networks	15
3.4 Technology Conclusions	15
4. Broadband Speeds	16
5. Government Broadband Initiatives.....	17
5.1 Project PROBE	18
5.2 Broadband Challenge Fund	18
5.3 Community Partnership Fund.....	19
5.3.1 Wellington City Council.....	19
5.3.2 Wairarapa.....	20
5.3.3 Porirua City Council.....	20
5.3.4 Porirua City Community IT Educational Trust.....	21
5.3.5 Porirua Pacific Island Forum	21
5.3.6 Upper Hutt City Council	21
5.3.7 Hutt City Council.....	22
6. State Sector Demand Aggregation	22
6.1 KAREN.....	22
6.2 GSN	23
6.3 Telecommunications Regulatory Changes.....	23
8. Council Broadband Projects	24
8.1 Upper Hutt City Council.....	24
8.2 Hutt City Council	24
9. Case Studies	25
9.1 Newtown Park Flats Computer Station	25
9.2 High speed broadband saves lives	26
9.3 Community media reinventing itself in the digital space.....	27

1. Current Broadband Infrastructure in the Wellington Region

1.1 Broadband in the Cities

The following table lists broadband providers in the region, indicating in which cities each of them has a presence. The extent of this presence varies amongst the providers. Telecom NZ has almost universal coverage across the region, and TelstraClear's cable network has a significant footprint in Wellington, Upper Hutt, Kapiti Coast and Lower Hutt. CityLink by contrast offers services in just over 400 buildings in Wellington's CBD – which is a reasonable number of business premises, but still a quite circumscribed presence.

Provider	Wellington	Hutt City	Upper Hutt	Porirua
Major Telco				
Telecom NZ	Y	Y	Y	Y
TelstraClear	Y	Y	Y	N
Metro Fibre				
Telecom NZ	Y	Y	Y	Y
TelstraClear	Y	Y	Y	Y
Citylink ²¹	Y	N	N	N
Vector Communications	Y	Y	N	N
Smartlinx3	N	Y	Y	Y
FX Networks ²²	Y	Y	Y	Y
Fixed wireless				
Woosh	Y	NAC	NAC	NAC
NZ Wireless (incl GASP)	Y	Y	N	N
Araneo	Y	Y	Y	N
Kordia (Extend)	Y	Y	Y	Y
Telecom NZ (WiFi Hotspots)	Y	Y	Y	Y
Smartlinx3	N	Y	Y	Y
Kordia (MetroWiFi)	Y	N	N	N
CafeNet (WiFi Hotspots)	Y	Y	Y	Y

Table from Grow Wellington Four Cities Report on Broadband (2008)

NAC = Not able to comment as the provider does not publicly specify attributes to be able to state an opinion

1.2 Miramar and Petone extensions

In 2008 CityLink installed about 15-20 kilometres of fibre optic cable from the CBD to Miramar

and within the suburb. The extension was funded in part by Peter Jackson's Weta and Wingnut group of companies to support their high bandwidth needs associated with film production. CityLink has also laid a nine-kilometre extension of its network from the Wellington CBD to Petone. Further extensions are being considered around Khandallah - possibly through to Johnsonville and eventually to Tawa and Porirua - and toward Gracefield.

1.3 Rural Provision

1.3.1 Wairarapa

The Wairarapa area covers the three District Councils of Masterton, Carterton and South Wairarapa.

Fibre optic cable networks from Telecom and TelstraClear generally follow State Highway 2 from Featherston through to Dannevirke, with FX Networks following the railway line route through the Wairarapa region. These networks provide Gigabit Ethernet service to high-end and business users although the cost of gaining access to the network access point is often prohibitive for individual customers.

Telecom NZ's New Generation Network (NGN) is currently being rolled out and will bring ADSL2+ to all of all of the townships by late 2011. The Masterton exchange is already equipped and will be followed closely by other towns in the Wairarapa.

While broadband is available to about 94% of households, service take-up is relatively low at 34% by comparison to the national average, which is in excess of 45%. An estimated 980 households are unable to get any form of broadband other than via satellite or possibly through a WiFi network operated by Wiz Wireless. Other than relatively minor network upgrades to maintain "business as usual" no network provider has plans to make any further investment in the region to increase broadband coverage in the rural sector.

Telecom NZ covers 94% of the combined districts, with Wiz Wireless covering 45% but overlapping many Telecom areas. Wiz Wireless appears to have had little impact on increasing overall coverage and uptake, but does provide alternative provision.

The majority of users in the Wairarapa region therefore see Telecom as the only viable supplier of broadband services with Wiz Wireless and BayCity/IPStar being a service of last resort in all but a small number of exceptional cases.

1.3.2 Kapiti Coast/Horowhenua (from Grow Wellington report *Kapiti Coast and Horowhenua Districts Broadband Capability Review*)

There are three major service providers – TelstraClear, Telecom NZ and FX Networks – with multiple fibre transmission routes through the area and offering Points of Presence (PoPs) or interconnection points in Paraparaumu, Otaki and Levin.

Gigabit Ethernet connections are available to high-end and business users in Paraparaumu and Otaki from FX Networks, TelstraClear and Telecom NZ. Although not in the Kapiti district, Levin will play an important role as a tier 0 or 1 node within Telecom NZ's planned Next Generation Network (NGN), hosting many of the other switch points in the area and therefore highly interconnected with other national tier 0/1 exchanges. This is being exploited by major customers requiring highly reliable national connectivity.

Telecom NZ's ADSL2+ provision program for exchanges and cabinets is not expected until end 2009 for Paraparaumu and Otaki with Raumati, Waikanae and Paekakariki not programmed until late 2011. Fast broadband is available via TelstraClear's Hybrid Fibre-Coaxial (HFC) cable service, but exact uptake is unknown. The service is generally of higher quality than Telecom's existing ADSL service but has a limited growth path .

There is some experimental broadband wireless provision by LINKIT in association with Kapiti Coast District Council in the area from Otaki to Waikanae but, in general, restrictions on last-mile access mean that fast broadband will continue to be unavailable into the

distant future for areas beyond a 4-5 km corridor either side of the State Highway 1 and greater than 5 km from urban centres.

Approximately 15-20 per cent of users in the Kapiti Coast district are restricted to one provider – Telecom NZ.

There are an estimated 1,141 households with no broadband access in the Kapiti Coast District in the following geographical areas: 2-5 km east of State Highways 1 and 57 towards the Tararua Ranges; many of the valleys in the area, including Otaki Gorge; and West of State Highway 1 near Otaki Beach.

1.4 Wireless Provision

Provider	Wellington	Hutt City	Upper Hutt	Porirua
NZ Wireless (GASP)	Y	Y	N	N
Cellular broadband				
Telecom NZ	Y	Y	Y	Y
Vodafone	Y	Y	Y	Y

Table from Grow Wellington Four Cities Report on Broadband (2008)

1.5 Intra-regional backbone

Smaller fibre network operators provide some competition to the major telcos In respect of regional backhaul (that is, data transport from local aggregation points or exchanges to the core network) through open access networks. However, these are largely confined to the central city. Access to these networks from most premises depends on backhaul by Telecom NZ or TelstraClear from suburban cabinets or exchanges to the nearest point of interconnection.

1.6 Last mile/access network

The provision of last mile connectivity is dominated by the two major telcos, with some competition from CityLink in the CBD and wireless network operators. This was seen as the major bottleneck in the broadband market, and the reason behind the government's telecommunications regulatory changes to open the local loop to other service providers.

There is likely to be continuing incremental growth in metropolitan fibre networks as these seek to leverage existing assets by reaching new customers. An example of this kind of development is the extension of CityLink's fibre network from Wellington's CBD to Miramar. However, progress can take time in this area.

Telecom's ADSL 2+ program provides services with access speed capability of between 10 and 20Mbps for customers within 2 km from a Telecom exchange or new ISAM equipped cabinet. All of the Telecom exchanges in the Wellington Central cities were converted from ADSL to ADSL2+ technology during 2007 and 2008 with an extensive program for the installation of ADSL2+/ISAM equipped cabinets well underway and targeted for completion by late 2011.

1.7 Regional Broadband Provision Summary

The Grow Wellington report "Wellington Region Broadband Gap Analysis Report and Recommendations, June 2008" had the following summary for the Wellington region:

"Government initiatives to date have had little impact on broadband provision in the four cities and Kapiti Coast district, and slightly more substantial impact on broadband provision in the three Wairarapa districts.

Direct subsidies for infrastructure development have been small in relation to the total amount of telecommunications infrastructure in the area. Central government has invested about \$1.5m in Telecom NZ provision to schools and communities in the Tararua and Wairarapa districts, an unknown amount in similar provision to

schools and communities in the Wellington/Kapiti Coast/Horowhenua cities and districts, \$2.3m in Smartlinx3, and a further \$400,000 in the Wellington Loop project.

The impact of KAREN and GSN on the Wellington region is limited by the fact that they are restricted to eligible state sector members (with the partial exception, in the case of KAREN, of private sector organisations partnering with KAREN members in regard to research). At this stage both networks have only a small number of members, though there is considerable scope to expand, as education, research and public administration are important sectors for the Wellington region in their own right. In Budget 2008 the government announced that it would spend an extra \$163.3m on public sector connectivity over the next five years, including substantial investments in health and education sector connectivity.

With changes in telecommunications regulation, it is too soon to see any real impact in the region. Telecom NZ's investment in the upgrade and cabinetisation of its network will be material, but the regulatory changes will not address the most significant constraint on broadband performance, which is lack of investment in the access network, i.e. last mile connectivity, or the local loop.

The New Zealand Institute argues that realisable average speeds using ADSL2+ will be well below the theoretical maximum – probably somewhere around 3-5 Mbps download, and even less upload. The regulatory changes will therefore not be sufficient to deliver the desired broadband targets for the region.

The impact of state subsidies and state sector demand aggregation is likely to be more significant and possibly quicker, although the former currently relies on a successful regional or council-based BIF application, and the latter on increased membership and use of KAREN and GNS.”

2. Broadband and Economic Development

There is now an international consensus on the benefits of fast broadband infrastructure and its importance for regions that wish to compete globally. The sheer volumes of digital information being moved and the technical limitations of copper-based and wireless technologies, mean that fibre-optic cable technology needs to form the backbone of any new system.

High quality broadband enables economic development and increased productivity; dramatically improves the delivery of education and health services and facilitates new forms of community engagement and participation in public life. Examples are more efficient use of specialist teachers using “virtual classrooms”, and the potential for health specialists to receive images of scans – on the other side of the world if necessary.

The OECD Paper “Broadband and the Economy 2007”, provides an analysis of the links between broadband and economic development. It states:

“networks are an increasingly integral part of the economy. As the technology evolves and bandwidth increases, the scope for broadband to act as an enabler of structural change in the economy expands as it affects an increasing number of sectors and activities.

Direct effects result from investments in the technology and from rolling out the infrastructure. Indirect effects come from broadband’s impact on factors driving growth, such as innovation, firm efficiency, competition and globalisation. Broadband facilitates the development of new inventions, new and improved goods and services, new processes, new business models, and it increases competitiveness and flexibility in the economy”.

In the Grow Wellington report “Four Cities Broadband Assessment” the author states:

“The impact of most new technologies is characterised by diminishing returns – each additional unit input of the technology has a smaller incremental effect on output. General purpose technologies, by contrast, tend to be opposite – they have an increasing impact as their diffusion grows. In the case of broadband, as bandwidth increases, businesses invent new ways of using it, which further stimulates demand for bandwidth.

At the level of the Internet as a whole, this dynamic can be seen in the emergence of music and video sharing websites, which both depend on growing bandwidth and drive up demand for it. In a regional context, availability of fast, affordable broadband will influence both the level of innovative activity among businesses in the four cities and impact decisions by firms about whether to locate here or go elsewhere.”

Potentially significant environmental benefits are also available, such as reduced road congestion because of telecommuting and energy conservation through “smart metering”. A significant body of research now exists which has analysed these benefits and impacts. Some, such as productivity improvements are readily quantifiable, and others, such as the benefits of increased e-democracy, relate more to wellbeing or quality of life and are therefore difficult to put a monetary value on. The focus of the Wellington Regional Strategy is on the economic development benefits of broadband and beyond that there are a wide range of social and environmental benefits of interest to councils.

Where telecommunications services are delivered by the private sector, the need for significant new investment has created a major issue. Vertically integrated telecommunications companies (where the owner of the infrastructure can restrict who runs services over it and therefore prevent competition) rely on their own, separate networks, which only service part of the market. Their business case for new investment in this expensive infrastructure is weak, so although more investment will happen, it will not be at the rate necessary to achieve a step change in performance. The situation is similar to

other essential and high cost networks with monopoly characteristics, where there is either comprehensive regulation or the infrastructure is owned outright by the community.

The New Zealand Institute's 2008 report "Delivering on the Broadband Aspiration: A Recommended Pathway to Fibre for New Zealand" states:

"Capturing many of these economic benefits increasingly requires high speeds and so New Zealand's policy focus should shift from encouraging penetration to increasing the speed of the network. This means investing in a fibre network."

The New Zealand Institute has identified national economic benefits from broadband in the range of \$2.7-4.4 billion year with further upside potential possible. There is a significant cost to waiting. The longer that New Zealand waits, the more economic value it will forego and so New Zealand should approach the investment in fibre with urgency."

The study assessed the benefits of fast broadband for productivity and growth in the domains of telepresence (i.e., high-end video conferencing), digital media, data storage and manipulation, remote working, health care and education. These yield benefits of \$2.7-4.4 billion. If Wellington were to capture a proportionate share of these benefits on a population basis, this would amount to about \$240-400 million per annum. Estimates of the benefits from innovation in the weightless economy were put at \$5.5 billion per annum nationally, which would imply, on the same calculation, about \$500 million for the economy of the Wellington region.

3. Broadband Technologies

Broadband is currently delivered through a number of different technologies – copper wires, fibre optic cabling and wireless signals. Each technology or combination of technologies has different speed, capacity and investment return characteristics. As applications and services have grown in complexity and demand for them has increased, more bandwidth has been needed, and the speed of broadband networks has become increasingly critical.

The current networks across the city, between cities and out of New Zealand have all come under scrutiny, with questions asked about their technical capacity and the way in which they are currently managed.

- Connectivity into and out of the city (i.e. the “state highways” and “international trade routes”). These are the big “pipes” which link the cities to the rest of the region, the country and globally to trading partners and potential markets.
- Intra-city backbone (i.e. major arterial roads). These are medium pipes that carry the bulk of data traffic, allowing data to move around the city. The backbone can potentially link schools, medical centres, council facilities and businesses in suburban areas (i.e. a MUSH network¹).
- Local connections to each home and building (i.e. local roads and driveways). These are the smaller pipes that link up streets and individual customers and are the final connection between the backbone and a home or premises. Because of the number of connections needed to link all homes and buildings, these “last mile” connections generally comprise the bulk of network infrastructure costs.

¹ Networks developed by connecting Municipalities, Universities, Schools and Health providers.

It is possible for different players to be responsible for different parts of the infrastructure. Likewise, it is possible for different parts of the infrastructure to be provided using different mixes of technology.

3.1 Copper wires

In New Zealand, the majority of broadband offerings currently available to households are over copper loop technology. Many households still use “dial-up” connections, which at a speed restricted to a maximum of about 40Kbps is a major constraint in access to media rich services and does not qualify as broadband that will deliver the benefits noted previously.

Telecom’s first generation ADSL (Asymmetrical Digital Subscriber Line) connections are still common in Wellington houses (however all city exchanges were converted to ADSL2+ technology during 2007/2008).. They use a more advanced technology and can be available at a number of speeds, largely depending on the length of the last mile copper loop, i.e. the distance from the backbone to a home or premises. Such technology, however, is still limited and as the name suggests, generally cannot provide symmetrical bandwidth. Deployment of the ADSL2+ cables allows Telecom NZ to further extend the life of their copper access network, providing up to 20Mbps access speeds.

VDSL (Very high data/bit rate Digital Subscriber Line) is more recent technology that can provide faster speeds and multiple services over the copper connection. This technology, however, is not commonly available in New Zealand, largely because it is enabled by fibre cabling being rolled out to within 300m of each house (often called fibre to the home, FTTH). The average length of New Zealand’s copper loop is usually significantly longer than this. If it was available, VDSL would represent a significant step forward in terms of the speeds delivered, although in the medium to long-term copper (a 100 year-old technology) VDSL would not be capable of meeting the evolving needs of businesses and residents.

3.2 Fibre optic cables

Many of the cities involved in providing broadband infrastructure are doing so through fibre based networks. Because fibre optic cabling uses a data transmission method with immense capacity and scope for significant upgrading, it is widely accepted that its bandwidth is unlikely to be matched by other technologies for the foreseeable future. More and more data can be transmitted down the same strand of glass fibre by changing the electronics at each end, as evidenced by the recently announced upgrade to the Southern Cross Cable between New Zealand and the United States. Fibre is seen as providing the most ability to future proof a city's high speed bandwidth needs.

3.3 Wireless access networks

Wireless technologies can provide a variety of broadband services and they receive significant media and popular attention. However they do not currently represent a broadband technology that has, or will have (using foreseeable developments), capacity comparable to fibre cabling. Apart from capacity, wireless can be limited by obstacles (buildings, hills) and some versions using unlicensed spectrum may be limited in range and subject to interference. However, wireless technology will remain an important part of the mix because consumers have increasing expectations that they will be able to obtain mobile services as they move around a city, as well as fixed line services when they are at work or in their home.

Wireless networks have cost advantages particularly in rural locations, and do provide for mobility. But their performance is generally below that of fixed line technologies. Some wireless infrastructure was deployed in the hope that it could seriously compete with the Telcos' offerings, but has not made sustained, significant inroads into their market share. The technology has not evolved fast enough to approach the performance of ADSL2+

3.4 Technology Conclusions

Experience in other cities shows that the further fibre reaches out into the network (i.e. the closer it is to the home or premises) the higher the speed or capacity that can be achieved

over the remainder of the network. The constraint is then isolated to a final link that can operate reasonably effectively over short distances. Therefore in the medium term it is likely that broadband will continue to be delivered through a mixture of technologies including fibre optic cabling, existing copper wires, and wireless options.

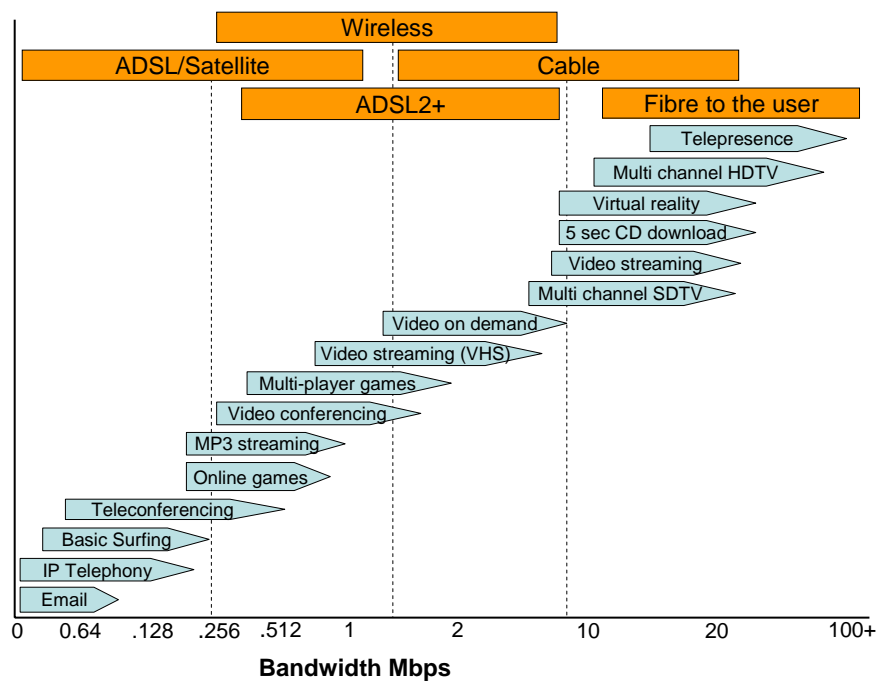
In the longer term there are technical constraints on the ability of copper or wireless to deliver ever increasing speed requirements. It is now a widespread expectation that fibre optic cabling to the premises and home will eventually be required. Fibre networks offer unrivalled capacity and should remain the ultimate objective for communities.

4. Broadband Speeds

“True” or high capacity broadband, where the capacity constraint is in effect removed for both downloading and uploading, typically needs to run at speeds of tens of Mbps and up to 100 Mbps or more. It enables many applications to be run (often simultaneously), such as:

- video-conferencing – e.g. via an “access grid”, where people in a number of locations are able to meet together through video links
- telemedicine/online health services – e.g. remote diagnostics or surgery, linking elderly patients with a video nurse
- online education/e-learning – e.g. enabling schools to increase subject availability through videoconferencing, reducing costs to schools through shared resources
- increased entertainment opportunities – e.g. High Definition TV (HDTV), video on demand, online gaming
- improved telecommuting choices – e.g. enabling individuals to work at home on complex files/graphics, small businesses to overcome location disadvantage by being able to fully utilise internet based marketing
- energy sector innovations – e.g. such as “smart metering”, which enable energy savings.

The following graph provides an example of the broadband capacity needed to access certain applications/services.



5. Government Broadband Initiatives

In 2005 the government launched its digital strategy; a plan to improve digital technologies and connectivity to drive New Zealand's productivity and economic growth.

The Government's Digital Strategy 2.0 (2008) has a goal of increasing broadband provision and uptake. Government initiatives that have supported this goal to date are:

- Subsidies for infrastructure development – Financial support has been provided to infrastructure development through Project PROBE and the Broadband Challenge Fund. PROBE was essentially completed by the end of 2005, having successfully provided broadband access to 891 schools at a final cost of \$45 million.

- State sector demand aggregation - Two collective approaches to procurement of high-speed broadband are the Government Shared Network (GSN) and the Kiwi Advanced Research Network (KAREN).
- Regulatory changes in the telecommunications industry – The operational separation of Telecom and Local Loop Unbundling (LLU) aimed to foster competition in the telecommunications market and facilitate efficient investment in telecommunications infrastructure.

5.1 Project PROBE

This was an initiative of the ministries of Education and Economic Development to ensure all rural New Zealand schools could access broadband. The aim of the project was to generate significant benefit for surrounding communities in terms of access to broadband through the technology established through PROBE. Approximately \$49 million was spent and the project ran from 2002 to 2005 nationwide.

- Telecom NZ and BCL won the contract for PROBE delivery in the Wellington region. Five out of 197 schools in the four cities received assistance.
- Telecom NZ and Ministry of Education delivered the PROBE contract for the Wellington/Kapiti Coast/Horowhenua cities and districts in 2004. Six schools received assistance through the project.
- Telecom NZ and the Tararua-Wairarapa Regional Charitable Trust (TWRCT) won the PROBE contract for the Tararua-Wairarapa area in 2004. A separate (but related) contract to make broadband available to 26 of the 73 schools in the two districts was signed at the same time between the Ministry of Education and the TWRCT. The Ministry also agreed to extend the coverage to an additional 34 rural cabinets.

5.2 Broadband Challenge Fund

The fund aimed to support partnerships to develop high-speed networks for urban and regional centres, and broadband rollout to remote and under-served communities.

Smartlinx3 is an open access provider whose shareholders are members of the local community and the three City Councils, Upper Hutt City, Porirua City and Hutt City as well as the Hutt Mana Charitable Trust. It won approximately \$2.4 million from the \$24 million Broadband Challenge fund. Smartlinx3 is building an open access fibre and wireless network, providing at least 2 Mbps symmetrical connection speeds to CBDs in Porirua, Hutt and Upper Hutt, and to some greenfields development sites, e.g. Aotea Block.

5.3 Community Partnership Fund

The Community Partnership Fund (CPF) aims to support local, regional and national initiatives, through partnerships, to develop and achieve capability, confidence, relevant content, and connections around Information and Communications Technology.

5.3.1 Wellington City Council

The Community Partnership Fund granted the Wellington Loop project a \$400,000 grant in 2007 to link six schools in Wellington City to a high-speed fibre optic loop. Contact Energy, Wellington City Council and CityLink support the project which will provide the infrastructure. The connection runs at 1 Gbps. The Loop is to be connected to KAREN, and if the initial 2-year pilot is successful, it may be extended to other Wellington City schools.

Wellington City Council is working on a new Community Partnership Fund Expressions of Interest to expand the Wellington Loop. The Loop has successfully developed an e-based collaborative learning environment that makes educational resources and opportunities immediately available to schools. So far six schools directly benefit from the Loop, but the model is scalable to further schools that have the desire and ability to participate. The aim of this expansion is to reach 10 schools in the greater Wellington area as the fibre network is extended.

5.3.2 Wairarapa

Project: Aotearoa People's Network

The Masterton Council Library was a key participant in phase one of this program which was essentially run by the National Library. The Aotearoa People's Network (APN) is about providing free access to broadband internet services in public libraries so that all New Zealanders can benefit from creating, accessing and experiencing digital content. The network currently extends to 58 libraries across New Zealand, mostly in smaller, rural communities, with another 28 libraries in the pipeline.

Masterton currently has 8 PCs available to the public which are used extensively by a broad cross section of people. Phase one of the project included Masterton District Library, South Wairarapa District Library, Carterton District Library and the libraries of Greytown, Featherston and Martinborough.

Project: Image Wairarapa (Development of the foundation layer)

Masterton District Council received \$85,050 to digitise collections from the Wairarapa Archive Museum of Art and History and Library, using Matapihi and Dublin Core standards. Training for volunteers will be provided.

5.3.3 Porirua City Council

In 2006 Community Partnership funding was received for a project to develop a digital hub including technology planning and technical support, creating a city portal, establishing an ICT learning strategy and implementation of four community access points (centres).

In 2007 funding was received to create the Digital Porirua Vision.

Community Partnership Funding was received for an Asset Map Project (Business, community and voluntary sector; ICT infrastructure and Learning centres; awareness raising; GIS). The project involves researching how ICT is used by the city's community & voluntary sector, schools, E-Centres, ICT learning providers, our local ICT sector and home based businesses. It will also explore the challenges research participants

experience in using ICT and realising their aspirations for future growth. Geospatial information systems will be used to represent much of the data and create a range of discussion and planning documents to guide our next steps.

5.3.4 Porirua City Community IT Educational Trust

A Community Partnership Fund grant was awarded for 150 families in Porirua to join the Computers in Homes programme. The Computers In Homes project (CIH) aims to support low income communities to use ICT to strengthen their education. It is very much about what ICT can do to for family opportunity rather than a hardware dump or the learning of computer skills for their own sake.

Community Partnership funding was received to develop the Digital Porirua Vision which aims to develop Porirua as a 'digital city'.

5.3.5 Porirua Pacific Island Forum

With Community Partnership funding, PPIF is expanding its ICT Learning Centre to include a training component. The Siaola project has kicked off the development of a prototype eLearning tool called Tohitapu that has been designed to meet the needs of the Tongan community. This tool has been developed using a mix of user-centred, learner-centred and metaphorical design so it reflects the culture of the people who will be using it.

5.3.6 Upper Hutt City Council

A community ICT Learning Centre has been set-up alongside the community centre in Timberlea with funding from the Community Partnership Fund. Timberlea is an economically low-decile area that is geographically separated from the main area of Upper Hutt City. The lack of resources in many Timberlea households – from the practical (landlines) to the IT knowledge of families – indicated a strong community need for more connection with the digital world. Building delays have had some impact on the project's completion, however, the progress on the ICT front is exciting, and even needing to put a "design freeze" in place is a sign of the continued enthusiasm about the project.

5.3.7 Hutt City Council

Hutt City Council has sought funding to develop a Computer Clubhouse. Clubhouse Trust NZ wants to develop five new clubhouses throughout NZ and five Clubhouses around the Pacific.

The Computer Clubhouse provides a creative and safe after-school learning environment where young people from under-served communities work with adult mentors to explore their own ideas, develop skills and build confidence in themselves through the use of technology. The approach helps young people to acquire the skills necessary for personal and professional success and supports them into higher learning pathways.

6. State Sector Demand Aggregation

The two key state sector networks, the Kiwi Advanced Research and Education Network (KAREN) and the Government Shared Network (GSN) have been developed to achieve cost savings in procurement as well as meet specific needs of the state sector agencies that comprise their membership.

6.1 KAREN

With a speed of up to 10Gbps broadband connectivity, the KAREN network provides links between New Zealand's research and education institutions, to support leading edge research and data-sharing. It is run by crown-owned company Research and Education Advanced Network of New Zealand (REANNZ).

KAREN does not lay or own fibre or other transmission infrastructure, but sources connectivity from existing providers. It has 18 members comprising all of New Zealand's universities and Crown Research Institutes (CRIs), and the National Library. Schools, wananga, polytechnics, libraries, museums, private research institutes and private sector partners engaging in research and education activity, may become future members. The Wellington Loop project will connect local schools to KAREN.

6.2 GSN

The Government Shared Network has a 2 Gbps core network backbone and offers speeds up to 1 Gbps to participating agencies. It comprises a fibre optic network currently accessible from Auckland and Wellington CBDs as well as a Wide Area Network (WAN) linking agency locations around New Zealand. As with KAREN, GSN procures connectivity from existing telecommunications providers. From February 2008 eleven agencies were connected to the GSN, with a further nine having signed contracts to take up GSN services.

6.3 Telecommunications Regulatory Changes

The New Zealand Government has been increasingly concerned that NZ is not growing as fast as our trading partners in our uptake of broadband and our adoption of digital services. And following a telecommunications "stocktake" in early 2006 the Government introduced the Telecommunications Amendment Bill which is the most fundamental change to the structure of telecommunications in NZ since 1987.

The key outcomes of the new legislation are:

- The "operational separation" of Telecom into distinct wholesale, retail and network "businesses" that are required to work equally with all parties.
- "Local Loop Unbundling" (or LLU) – replicates a common feature of overseas telecommunications markets in the requirement for the incumbent telco to provide access to its copper "final mile" network to all parties at a fixed price.
- "Naked DSL" – this is the requirement to provide competitors access to a Digital Subscriber Line broadband connection without the need for voice line as well.

The full consequences of these interventions may take several years to emerge but it is hoped these requirements will stimulate a broad range of initiatives and innovations in the market. Telecom for example has said that it is developing an investment plan to resolve broadband performance issues. In late 2007 the company announced plans for investing in its Next Generation Network (NGN) and building of fibre to the node – a package totalling

\$1.4bn over five years. Part of Telecom NZ's investment plan is a major programme of "cabinetisation" of its network, i.e. extending fibre optic cables out to roadside cabinets installed between customers' premises and telephone exchanges. It expects that more than 3,500 distribution cabinets will have been installed or equipped with ADSL2+ or equivalent DSL capability 2 by 2012. This will allow them to deliver faster broadband to many customers, as the performance of copper cable in delivering broadband declines quite steeply over distance.

8. Council Broadband Projects

8.1 Upper Hutt City Council

Upper Hutt City Council is using GPS readings to record the exact locations of all 4782 plaques and headstones at the Akatarawa Cemetery. The precise locations of the plots will be accompanied by photographs of each headstone on the council's website where it will link with existing cemetery records.

8.2 Hutt City Council

Hutt City has a website portal offering free web space and site management tools. An unlimited number of independently designed sub-sites can be hosted. Huttcity.com is about getting community groups and small businesses doing business and communicating using the internet. With limited internet familiarity and resources the target group are unlikely to have previously had an online presence.

Hutt City Council's Digitisation Programme is about creating electronic versions of existing Council paper and microfiche documents. The Digitisation Programme has been designed to ensure that this occurs in a manageable way that addresses Council's priorities and reduces potential risks to both business processes and the documents themselves. The Digitisation Programme is a 3.5 year initiative that involves the conversion of paper microfilm, microfiche and other record sets to digital images There are significant internal &

external benefits to Hutt City Council & its Rate payers in completing this work. Many records are used for a very long length of time. Digitisation of core long life documents is definitely the direction all other councils are taking or will eventually take.

The Museum of Science (Boston) established the first Computer Clubhouse in collaboration with MIT Media Laboratory in 1993. The Computer Clubhouse model is an innovative award winning model with active longitudinal research conducted by SRI International.

Hutt City Council, through Libraries, has been invited to be part of the development of Computer Clubhouse in New Zealand. Clubhouse Trust NZ wants to develop five new clubhouses throughout NZ and five Clubhouses around the Pacific.

The Computer Clubhouse provides a creative and safe after-school learning environment where young people from under-served communities work with adult mentors to explore their own ideas, develop skills and build confidence in themselves through the use of technology. The approach helps young people to acquire the skills necessary for personal and professional success and supports them into higher learning pathways.

9. Case Studies

9.1 Newtown Park Flats Computer Station

From research to business initiatives, homework projects and job hunting - residents of Wellington's Newtown Park Flats use broadband for a huge range of activities.

The Wellington City Council-run computer station at the Mansfield Road complex, provides broadband Internet access for hundreds of residents. The centre has 8 PC's available for use and an onsite coordinator on hand to assist users.

Myra Latimer, ICTE Learning Co-ordinator at the site, said the facilities were used so extensively that the current system was often stretched to the limit. At present the station has a wireless connection of about 4MB upload and 2MB download. As this is shared between all users it can run fairly slowly especially when large amounts of data are being downloaded.

The benefits that the centre brings include better social participation, increasing learning and research tools, and providing economic opportunities such as being able to look for jobs online.

“The facilities here are good but to be hard wired would be a huge advantage as the system currently gets very slow when it rains or if people are listening to music or downloading a lot of data. Ideally we would like a higher amount of bandwidth and higher speed” says Myra.

Myra said many young residents use the station’s computers and the internet as an essential homework tool, which often involved downloading large amounts of graphics and information.

“People use it for so many things, including job hunting and to design CV’s,” she said. “It has even enabled one couple to set up their own business selling items on Trademe. They have a computer but don’t have Broadband. We download photos from the camera for them. Without Broadband it would take forever.



Making IT accessible Myra Latimer, ICTE Learning Coordinator and Aneesa Adam, former Learning Coordinator with clients at the Newtown Flats computer station.

9.2 High speed broadband saves lives

Lifesaving librarianship is one of many benefits of high-speed Internet connectivity.

Rachel Esson, library manager at University of Otago Wellington School of Medicine and Health Sciences said high-speed broadband is essential for accessing medical databases providing information for doctors and medical students. Large amounts of medical data are downloaded daily. When rare complications arise during surgery, the library may receive an urgent request to search specific information and fax it to theatre within minutes – so broadband literally saves lives.

“Medline, the medical database we use most, is hosted in Utah and updated daily so we need very high quality access,” said Rachel. “We have access to over 30,000 electronic medical journals and need to download high resolution PDF’s and illustrations rapidly.

The library has nearly 60 computers - 18 available for 24-hour access - and eight ‘e-stops’- PC stations available for a short time.

“It gives clinicians access to vastly more medical research and information. We host several online resources such as UpToDate, which provides topic reviews, overviews and expert opinions about treatment and diagnosis. The hospital and school do 50,000 downloads a year from UpToDate.”

“Data which once took weeks to access, takes minutes. The latest international medical journals are downloaded immediately. It helps New Zealand medicine keep abreast of international developments and creates network and relationship building opportunities.

“Post grad’ students use interactive learning platforms such as Blackboard. Blackboard @ Otago provides staff and students with access to communication tools, course materials, discussion forums, online assessment and many other features to help them manage their study or teaching.

Broadband is also vital in enabling clinicians to hold videoconferences with other centres countrywide for patient and teaching purposes.

Dr Thorsten Stanley, Senior Lecturer in Paediatrics regularly uses the TelePeds virtual private network for videoconferences with paediatricians across New Zealand. Patient pictures are sent in digital format.



Rachel Esson, Library Manager at the School of Medicine and Health Sciences.

9.3 Community media reinventing itself in the digital space.

High speed broadband has transformed Access Radio since it was launched as New Zealand’s first access community radio station in 1981. The Wellington station now provides live streaming, audio on demand and pod casting from its website – www.accessradio.org.nz

General Manager Kedron Parker said: “High speed makes all the difference for us, for listeners and for our community broadcasters. Broadband has allowed us to do Internet broadcasting and to improve our traditional 783AM broadcasting service.”

Access downloads material from international broadcasters including the BBC and Radio New Zealand International Dateline Pacific. Programmes are uploaded onto the station’s website daily. Slower speed would mean Access could not upload as much.

Speed has “unleashed a wave of collaboration” with other Access stations - enabling group and online chats. Access Internet Radio offers streaming and downloadable content from Access Radio Wellington, Community Radio Hamilton and Fresh FM in Nelson - connecting communities.

Shows promote cultural links. When Access began streaming in 2004 Pacific Island stations immediately began picking up and broadcasting the streams.

Speed and bandwidth isn't a problem - Access has a Citylink 10 gig plan - but cost is. "Broadband costs are increasingly difficult to manage," said Kedron. "We need to ensure staff and programme makers can get online but our bills for internet traffic are huge.



Taking to the air. Allan Jones, No Labels coordinator, and Robert Spencer, presenter of the Brooklyn Galleria Half Hour, in the Access Radio studios.