



Nisku Business Park Broadband Study

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1. Executive Overview

Leduc County contracted ViTel Consulting Inc. and Taylor Warwick Consulting to complete a Regional Broadband Feasibility Study. The study will provide an analysis of the existing providers and their services available throughout the County—including, DSL and Cable Providers, Wireless Internet Service Providers (WISPs), and Mobility Providers—and it will recommend different strategies for dealing with the different parts of the County, including unserved broadband and mobility regions, hamlets and villages, and the Nisku Business Park.

Nisku has over 400 companies and is a vibrant centre of diversified industry. Many Nisku companies are doing business globally and are actively developing new products through research and development. In order for new businesses to be attracted to the park and existing businesses continue to grow it is imperative that the current and future network architecture provide high capacity broadband access services.

Nisku's current communications infrastructure is comprised of multiple access technologies used to deliver broadband services. These technologies include fibre, copper, and wireless. A few larger businesses have seen the need for higher bandwidths so they have implemented private fiber access networks. The remaining businesses use either the existing copper or wireless networks. These networks will quickly become inadequate to support the communications requirements of the Nisku businesses.

Reliable high capacity broadband access is no longer a nice to have, but a must have for all businesses in Nisku. As a result a prerequisite for all new businesses parks being deployed will be a fiber network infrastructure. Implementing a high capacity fiber based network in the Nisku Business Park is long term investment in Leduc County's ability to build community capacity and initiate economic development. The capital cost to build a fiber network in Nisku is estimated to be between \$5,000,000 and \$6,000,000. This estimated is based on an estimate of 53,185 meters at a cost of \$90.00 per meter. This estimate is for planning purposes only, and more detailed estimate would have to be completed prior to budgeting for implementing the fibre network.

An alternative to implementing a fiber network would be to install a Tier 1 or 2 wireless communication tower in a central area. A Tier 1 or 2 tower is designed to support multiple wireless tenants including mobility, broadband, public safety, and private enterprise. Current WiMax fixed wireless technologies have a theoretical maximum bandwidth of 75Mbps and the target for the next generation of wireless technologies such as Long Term Evolution (LTE) is as high as 100 Mbps on the downlink, and up to 50 Mbps on the uplink.

The capital cost to build a Tier 1 tower is between \$350,000 and \$400,000 with an estimated operating costs of \$1500.00 per month. A Tier 1 tower would be able to support all wireless communication services required by the Nisku businesses for the next 20 to 30 years.

Implementing a high capacity fiber network in Nisku is the ultimate goal but due to the high initial capital and ongoing operating costs ViTel Consulting is recommending that Leduc County explore the option of partnering with TELUS or Shaw to upgrade the existing infrastructure. If neither provider is interested in upgrading the existing network then ViTel Consulting recommends that Leduc County implement a Tier 1 tower that would support multiple wireless providers including public safety, broadband, mobility and private enterprise. The wireless providers will be able to provide to the Nisku Business Park high capacity wireless services over at least the next 10 years. When Nisku's businesses bandwidth requires exceed the maximum capacity of the wireless technologies Leduc County will have to reconsider the implementation of a fiber infrastructure.

2. Broadband & Economic Development

The Leduc County decision makers who make the call on broadband projects want quantifiable economic objectives to which they can hold someone accountable, their constituents desire the same assurances and benchmarks to ensure accountability. The biggest challenge for municipalities is measuring the economic benefits of implementing a broadband network.

Every two years, the International Economic Development Council (IEDC) conducts a survey with economic development professionals to learn how broadband is impacting their economic development efforts. This year 301 individuals participated in the survey. The respondents were asked if a broadband network would have either direct or indirect impact on attracting new businesses, retaining business, and improving profitability. The results of the survey are shown in Table 1.

Table 1: IEDC Survey

	Direct Impact	Indirect Impact
Attracting new businesses	55%	21%
Retaining business	42%	29%
Making businesses more competitive	40%	30%

In addition the respondents were asked what minimum bandwidths would be required to achieve these economic impacts.

Table 2: Minimum Bandwidth

	2-4Mbps	10-12Mbps	20-25Mbps	100-120Mbps	500Mbps	1Gbps
Attracting new businesses	8%	12%	13%	19%	15%	34%
Retaining business	6%	16%	22%	25%	15%	16%
Making businesses more competitive	5%	13%	23%	24%	15%	19%

Nisku has over 400 companies and is a vibrant centre of diversified industry. Many Nisku companies are doing business globally and are actively developing new products through research and development. In order for the Nisku businesses and the park to continue to grow it is imperative that the current and future network architecture provide high capacity broadband services.

3. Current Network

The Nisku businesses currently have access to a different broadband services including: Fixed Wireless, Point-to-Point Wireless, Digital Subscribers Loop (DSL), Cable, and Fibre. The type of broadband service available to a specific business may be dependent upon their geographical location in the park. Table 3 provides a list of the Nisku broadband service providers.

In order to estimate the average broadband speeds that are available to the Nisku businesses a speed test was conducted in the park. Using a customized PDF form businesses were ask to conduct the speed test using a test site located in Edmonton. (www.speedtest.net) The site conducts a test of the current upload, download speeds, and delay (ping). The form was provided to the businesses two ways:

1. Nisku Business Association provided access to the form on their web site.
2. The form was sent directly to ninety (90) businesses. Each business was selected based on their geographical location in the park.

As of March 1st, 2011 twenty-five (25) speed tests have been completed. (Appendix A: Nisku Broadband Speed Test)

Table 3: Service Providers

Service Provider	Fixed Wireless	Point-to-Point Wireless	DSL	Cable	Fibre
TELUS			16		1
Bell					1
Uniserve			1		
Rogers				1	
Tera-Byte	2				
XplorNet	0				
WiBand		2			
Terago		1			
Platinum	0				

Seventeen (17) tests were provided by subscribers using DSL. DSL is a copper-based technology. DSL subscribers had an average download bandwidth of 3.07Mbps and upload bandwidth of 1.13Mbps. The bandwidth available to DSL subscribers is directly related to the distance they are from the TELUS Central Office. (Appendix B: DSL Distance versus Bandwidth)

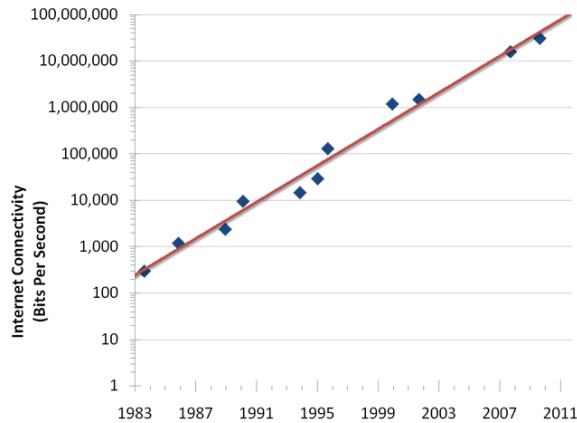
Six (6) tests were provided by wireless subscribers. The average download bandwidth was 5.84Mbps and upload of 2.69Mbps.

The two (2) remaining tests were provided by subscribers that have fiber access. The average download bandwidth was 65.7Mbps and upload of 35.17Mbps.

Most experts would agree that the minimum broadband access available in an industrial park should be a symmetrical based service of download 10Mbps and upload 10Mbps.

4. Future Network

The current network will quickly become inadequate to support the communications requirements of the Nisku businesses. Nielsen’s Law of Internet Bandwidth states that the bandwidth requirements have been growing more than 50% per year since 1983.



It is predicated that this trend will continue in the future. For this reason, it is important to implement a network that is able to scale to meet the future bandwidth requirements.

4.1 Fiber Network

A fibre network can support bandwidths from 1Gbps to 100Gbps. Most fiber implementations today use a hybrid fiber copper architecture called Fibre-to-the-Curb. The existing copper wire is reused from the pedestal to the building. (Appendix C: Fiber-To-The-Curb).

The average cost to implement a fiber network is approximately \$90.00/meter from the central office to the pedestal. The last 100 meters on private property is more expensive due to the time required to install the fiber from the pedestal to the building. Most service providers pay to install the fiber to the pedestal only, the subscriber or business pays to install the fiber from the pedestal to the building. The estimated capital cost to implement a FTTC network in Nisku is provided in Table 4.

Table 4: Estimated Costs

Components	Meters	Cost per Meter	Total Costs
Fiber Installation (Materials & Labour)	53,815	\$90.00	\$4,843,350.00
Project Management (10%)			\$484,335.00
Total:			\$5,327,685.00

Notes:

1. Total costs to be used for planning only.
2. Total meters provide Leduc County GIS Coordinator.
3. Does not include ongoing operating cost estimate.

4.2 Wireless Network

Current WiMax fixed wireless technologies have a theoretical maximum bandwidth of 75Mbps and the target for the next generation of wireless technologies such as Long Term Evolution (LTE) is as high as 100 Mbps on the downlink, and up to 50 Mbps on the uplink. XplorNet just recently announced the deployment of fixed wireless network based on WiMAX, and is software upgradeable to any future wireless technology including LTE. The wireless network will be capable of supporting bandwidths over 40Mbps and improving to 75Mbps by 2012.

A wireless network is comprised of different types of wireless communication towers. Each tower is designed to support one or more communication services. (See Table 5: Tower Types & Applications)

Table 5: Tower Types

Tower Types					
Tier	1	2	3	4	5
Applications	Utility	Carrier	Access	Broadband	Subscriber
Public Safety	X	X			
Mobility	X	X			
Private Enterprise	X	X			
SCADA	X	X	X		
Municipality	X	X	X		
Broadband Backhaul	X	X	X	X	
Broadband Access	X	X	X	X	X
Height (ft)	350	250	150	100	50
Capex (Est)	\$350,000.00	\$250,000.00	\$150,000.00	\$50,000.00	\$5,000.00
Monthly Opex (Est)	\$1,500.00	\$1,000.00	\$750.00	\$500.00	\$50.00

Each tower is specifically designed to support wireless communications equipment and applications. Tier 1 and 2 towers are designed to support multiple wireless tenants. (Appendix D: Tower Profiles) Tables 6 and 7 provide the estimated monthly and yearly collocation revenue for type of tower.

Table 6: Tier 1 Tower Estimated Revenue

Tenant	Height	Providers	Monthly Revenue	Yearly Revenue
First Responders	106m	1	\$1,000.00	\$12,000.00
Mobility	70m to 90m	2	\$3,000.00	\$36,000.00
WISP (Licensed)	60m to 70m	2	\$400.00	\$4,800.00
WISP (Unlicensed)	50m to 60m	2	\$400.00	\$4,800.00
Private Business	30m to 40m	1	\$300.00	\$3,600.00
Municipality	10m to 30m	1	\$300.00	\$3,600.00
Total:		9	\$5,400.00	\$64,800.00

Table 7: Tier 2 Tower Estimated Revenue

Tenant	Height	Providers	Monthly Revenue	Yearly Revenue
Mobility	75m	1	\$1,500.00	\$18,000.00
WISP (Licensed)	60m to 70m	2	\$400.00	\$4,800.00
WISP (Unlicensed)	50m to 60m	2	\$400.00	\$4,800.00
Private Business	30m	0	\$0.00	\$0.00
Municipality	20m	0	\$0.00	\$0.00
Total:		5	\$2,300.00	\$27,600.00

The deployment of a Tier 1 or 2 wireless communications tower in Nisku is alternative to the implementation of a Fibre-to-the-Curb (FTTC) network. The tower would have a positive cash flow in two to three years and support wireless technologies capable of supporting bandwidths up to 100Mbps in the near future.

5. Options

Reliable high capacity broadband access is no longer a nice to have, but a must have for all businesses. Companies are starting to use the quality and cost of broadband in an industrial park as part of their selection criteria. Leduc County has four options:

1. Incumbent Provider Upgrades the Existing Network.

TELUS Communications owns and operates the existing network. As part of the study the TELUS regional planner informed ViTel Consulting that TELUS has no current plans to upgrade the network.

2. A New Provider Builds and Operates a New Fibre Network.

A provider such as Shaw Communications builds and operates a separate Fiber-to-the-Curb (FTTC) network. Using the Shaw fiber network, the Nisku businesses would be restricted to using only Shaw's business services. ViTel Consulting had a strategic meeting with Shaw Communications to discuss the opportunity for Shaw to expand their services north of Airport Road.

3. Partner with a Third Party to Build an Open Access Fibre Network.

An open access fiber network provides structural separation between the fiber network and the service providers allowing all new and existing providers to share the fiber network and provide competitive services to the Nisku businesses.

4. Implement either a Tier 1 or 2 Wireless Communication Tower

The tower would be designed to support multiple wireless tenants including public safety, broadband, mobility, and private enterprise.

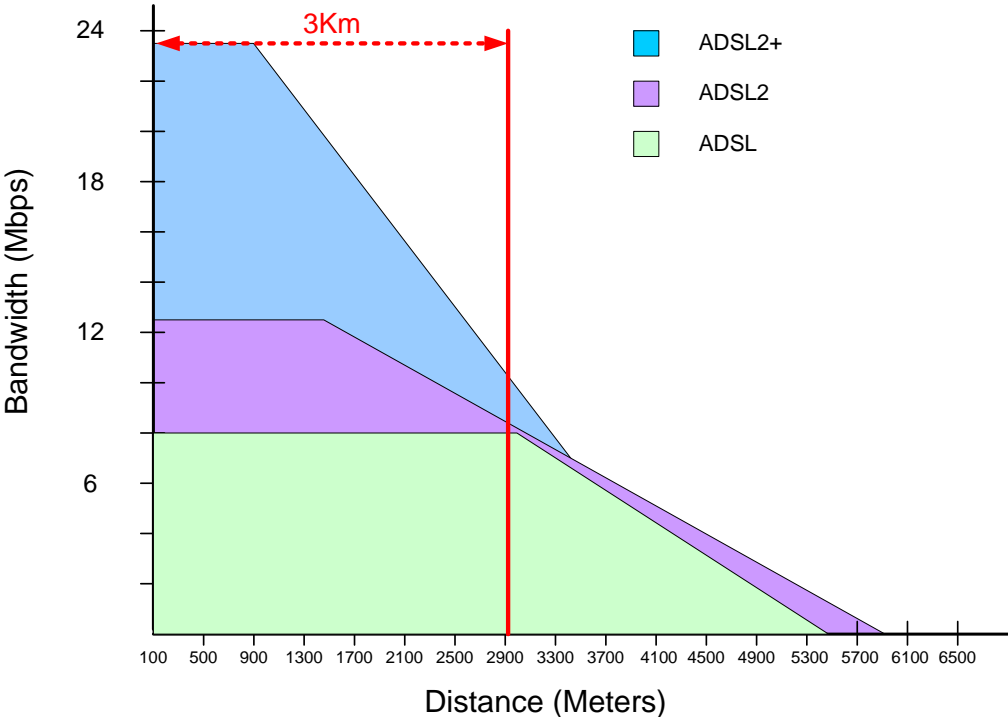
6. Recommendation

Leduc County is planning on implementing a new industrial park north of the International Airport. It is imperative that both Nisku and the new park have a high capacity communications infrastructure. ViTel Consulting recommends that Leduc County continued to explore options 1 and 2 for both parks. If options 1 and 2 are not successful ViTel Consulting recommends that Leduc County deploy option 4. A Tier 1 or 2 tower centrally located and designed to support multiple wireless tenants will support the park's bandwidth requirements for the at least the next 10 years.

Appendix A: Nisku Broadband Speed Test

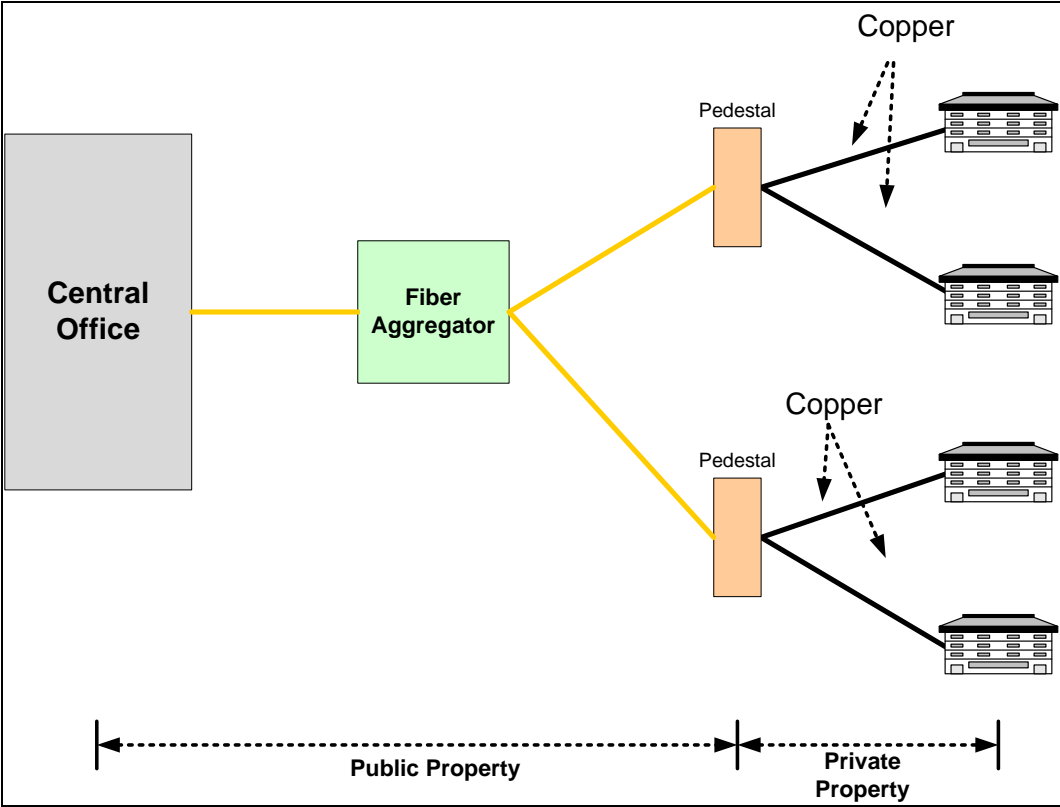
	Company	Address	Street/Ave	Provider	Tested Download Mbps	Tested Upload Mbps	Ping ms
1	Pyramid Corporation	2308	8	Telus	66.92	6.48	7
2	Ledcor	3925	8	Bell	64.67	63.86	0
3	Leduc County	1101	5	WiBand	9.08	5.49	10
4	Penco Engineering Inc	3350	8	Tera-Byte	8.46	2.13	26
5	Weatherford Canada Partnership	2603	5		8.19	4.32	34
6	PTI Travco Modular Structures	1507	8	Telus	6.68	4.29	16
7	Stemco	3350	8	Tera-Byte	6.54	1.94	26
8	Nisku			Telus	5.28	0.7	129
9	ESCO Corp	2323	4	Rogers	5.02	0.54	91
10	Command Energy Services	1804	5	Telus	3.4	0.45	10
11	Camex Equipment Sales & Rentals Inc	1511	Sparrow	Telus	3.03	0.36	213
12	AAMDC	2510	Sparrow	WiBand	3.03	3.31	10
13	Reliance Industrial Products	1801	8	Terago	2.96	2.77	14
14	T3 Energy Services	2302	8		2.83	2.98	10
15	Altus Energy	1604	8		2.8	0.69	26
16	Alegro	4520	211	Telus	2.64	0.87	21
17	Schwab Chevrolet	6503	Sparrow	Telus	2.63	0.13	20
18	Abrasive Blast & Paint Inc	1207	16	Telus	2.61	0.78	14
19	Ace Vegetation Service	2001	8	Uniserve	2.28	0.27	68
20	Noralta Lodge	2712	5	Telus	2.23	0.72	41
21	Edvan Industries Inc	1407	8	Telus	1.83	0.3	38
22	Gar-Don Steel Industries Ltd	1308	8	Telus	1.46	0.37	11
23	Garstad & Whittingham Realty Inc	1907	4	Telus	1.28	0.5	41
24	Tenaris	2307	8	Telus	1.13	0.25	74
25	Reliable Welding Services	504	12	Telus	1.12	0.4	38

Appendix B: DSL Distance versus Bandwidth



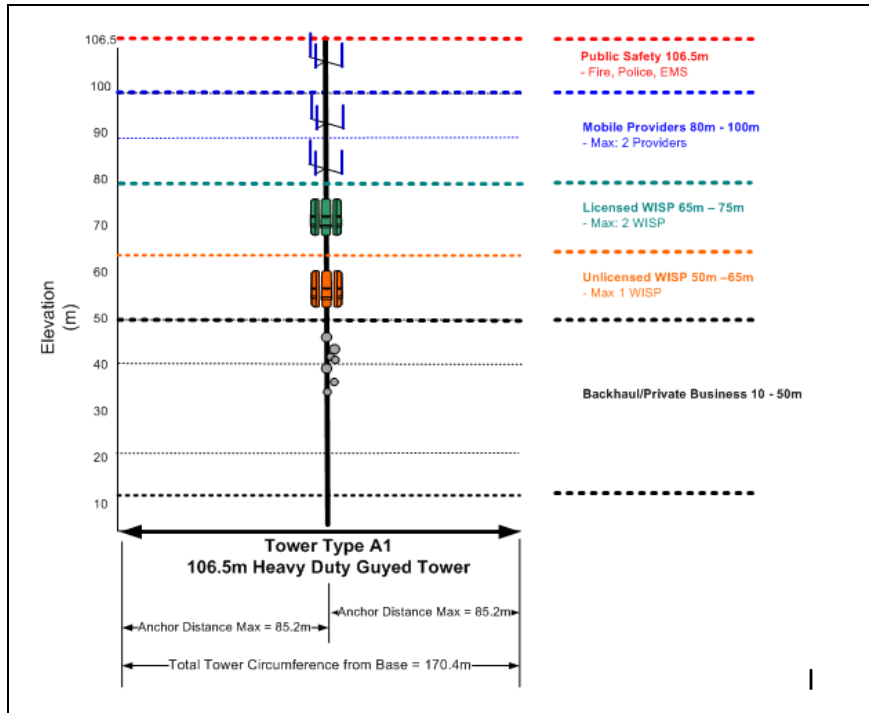
DSL bandwidth available to subscribers is directly related the distance they are from the TELUS Central Office. Subscribers within 3km of the central office may have a download bandwidth of up to 24Mbps.

Appendix C: Fiber-To-The-Curb (FTTC)



Appendix D: Tower Profile

Tier 1 Profile



Tier 2 Profile

