

# 9 Grizzly Regional Economic Alliance Society (GROWTH Alberta)

## 9.1 Current State

### 9.1.1 Regional Profile

As shown in Table 36, the study examines the current state of broadband within the Grizzly Regional Economic Alliance Society (GROWTH Alberta) region, a region encompassing 6 towns, 3 villages, 13 summer villages, 4 counties, and the Alexia Nakota First Nation. A map of the GROWTH Alberta region is shown in Figure 101. Please visit GROWTH Alberta’s website for more information <http://growthalberta.com/>.

Table 36 – GROWTH Alberta Communities

Towns	Villages	Summer Villages	Counties	First Nations
Barrhead Mayerthorpe Onoway Swan Hills Westlock Whitecourt*	Alberta Beach <sup>▲</sup> Clyde Wabamun	Birch Cove Castle Island Larkspur Nakamun Park Ross Haven Sandy Beach Silver Sands South View Sunrise Beach Sunset Point Val Quentin West Cove Yellowstone	Barrhead Lac Ste. Anne Westlock Woodlands	Alexis Nakota <sup>▲</sup>

\*Community resides within the northern Alberta study area and the NADC region but is not presently a member of a REDA.

▲ Community resides within the northern Alberta study area but is not presently a member of a REDA.

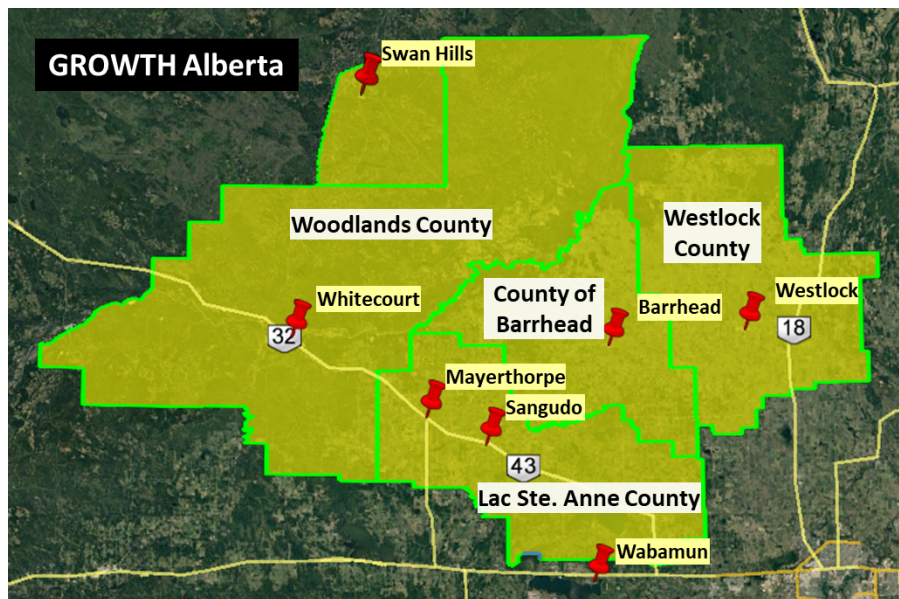


Figure 101 – GROWTH Alberta region.

TELUS has made a generational investment in fibre in the Town of Westlock. AxiaConnect (Axia) was in the Barrhead in mid-December 2016 soliciting expressions of interest for Axia fibre.

The region is home to approximately 57,000 residents.<sup>133</sup> Table 37 provides a breakdown by municipality (rural and urban) and First Nation as well as five-year population growth trends and CAGRs. Lac Ste. Anne County is the most populated municipality in the GROWTH Alberta region, with a population of 10,899. The 13 summer villages have grown significantly (approximately 26%) during the five-year period between 2011 and 2016. Clyde, after undergoing a viability review, decided to remain a village and implement the changes (directives) recommended by Alberta Municipal Affairs to achieve viability.

Table 37 – GROWTH Alberta Population & Population Growth Trends

Municipality	Rural				Urban					First Nations (FN)				
	Popu- lation (2016)	CAGR (%) (2011-2016)	5-Year Trend		City/ Town/ Village	Popu- lation (2016)	CAGR (%) (2011-2016)	5-Year Trend		Reserve / Settlement	Popu- lation (2016)	CAGR (%) (2011-2016)	5-Year Trend	
			(%) & Direction	(%) & Direction				(%) & Direction	(%) & Direction					
Barrhead, County	6,288	0.6	3.1	▲	Barrhead	4,579	0.7	3.3	▲					
Big Lakes, County					Swan Hills	1,301	-2.3	-11.2	▼					
Lac Ste. Anne, County	10,899	1.2	6.2	▲	AB Beach	1,018	3.3	17.7	▲					
					Mayerthorpe	1,320	-1.1	-1.1	▼					
					Onoway	1,029	-0.2	-1.0	▼					
					SV <sup>1</sup> (12)	1,538	5.5	30.9	▲					
					<b>Sub-total</b>	<b>4,905</b>								
Parkland, County	Study only included Wabamun				Wabamun	682	0.6	3.2	▲					
Westlock, County	7,220	-1.1	-5.5	▼	Clyde	430	-3.1	-14.5	▼					
					Westlock	5,101	1.1	5.8	▲					
					SV <sup>1</sup> (1)	44	15.8	3.0	▲					
					<b>Sub-total</b>	<b>5,575</b>								
Woodlands, County	4,754	2.0	10.4	▲	Whitecourt	10,204	1.2	6.2	▲	Alexis Nakota	755	-1.6	-7.6	▼
<b>Total</b>	<b>29,161</b>					<b>27,246</b>				<b>Total - FN</b>	<b>755</b>			

CAGR – Compound Annual Growth Rate

Note 1: SV - Summer Village: Birch Cove, Birch Cove, Larkspur, Nakamun Park, Ross Haven, Sandy Beach, Silver Beach, South View, Sunrise Beach, Sunset Beach, Val Quentin, West Cove, Yellowstone

Total Population = **57,162**

Source: Statistics Canada Federal Census 2011 and 2016.

The GROWTH Alberta region is home to 2,949 businesses (with employees). The top 10 industries in which they operate is shown in Table 38 and Figure 102 (industry classification system: NAICS). These data confirm a diverse economy with approximately 17% of businesses with employees engaged in the construction industry. The sector with the second highest ranking for number of businesses is the other services (except public administration) sector.<sup>134</sup> These two sectors makeup approximately 29% of

<sup>133</sup> Calculations based on Statistics Canada's 2016 Census of Population.

<sup>134</sup> Comprised of businesses primarily engaged in repairing and maintenance on motor vehicles, machinery, and other products; providing personal care, funeral, and laundry services; organizing and promoting religious activities; and supporting causes such as grant making and advocacy.

businesses with employees in the region. The ‘Other Industries’ segment (14.9%) shown in the Figure 102 chart includes industries that individually contribute between 3.7% and 0.3% to the category.<sup>135</sup>

Table 38 – GROWTH Alberta Number of Businesses (with employees) by Industry

Industry	Businesses	Percent (%)
Construction	515	17.5
Other services (except public administration)	337	11.4
Transportation and warehousing	300	10.2
Retail trade	286	9.7
Professional, scientific and technical services	257	8.7
Mining, quarrying, and oil and gas extraction	240	8.1
Agriculture, forestry, fishing, and hunting	224	7.6
Administration and support, waste management and remediation	126	4.3
Accommodation and food services	114	3.9
Health care and social assistance	110	3.7

Source: Calculations based on dataset provided by Alberta Economic Development & Trade, Economic Information & Analytics, Feb. 13, 2017.

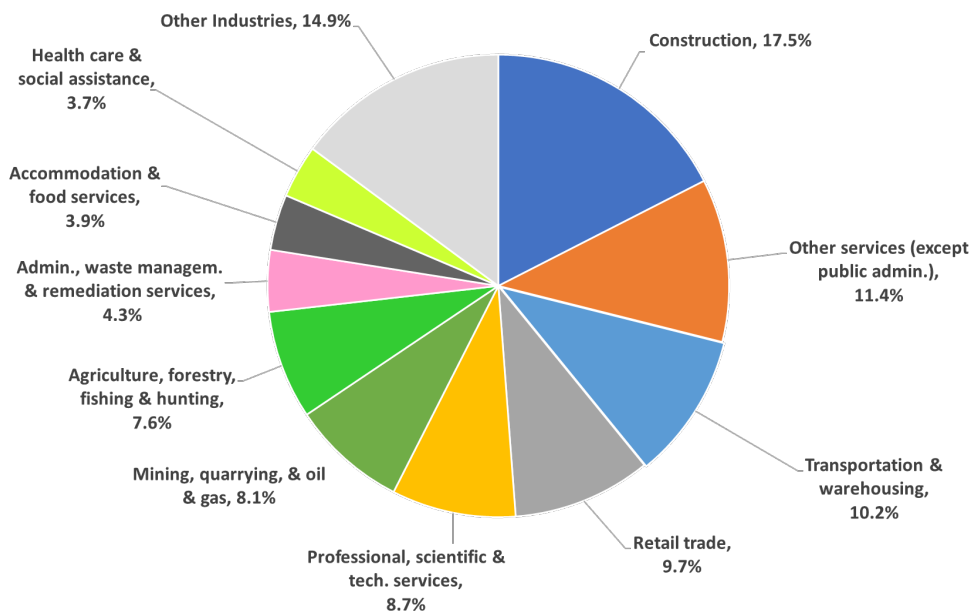


Figure 102 – GROWTH Alberta mix (based on business counts).

A cross-section of businesses in the region were surveyed by GROWTH Alberta as part of the study. When asked how important broadband connectivity was to their business, all respondents indicated it was ‘very’ important. The owner of an accounting firm said broadband connectivity was crucial for their communications with clients and the Canada Revenue Agency as well as for keeping up to date with tax changes.

<sup>135</sup> Real estate and rental and leasing; wholesale trade; manufacturing; finance and insurance; information and cultural industries; arts, entertainment and recreation; educational services; public administration; management of companies and enterprises; and utilities.

The majority of respondents indicated that the current connectivity speeds they were getting from their ISP were 'poor' (Figure 103).

**Q. How would you rate your current connectivity speeds?**

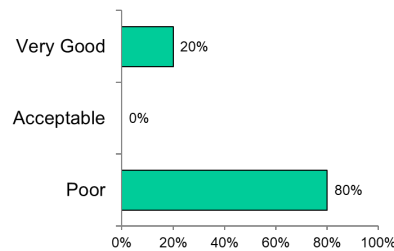


Figure 103 – Satisfaction with current connectivity speeds.

As shown in Figure 104, almost all businesses felt their business communities as well as their businesses would grow with increased broadband connectivity. Also, better connectivity would improve the way they do business. An association delivering an adult literacy program deemed high-speed broadband connectivity as 'vital' to the delivery of these services to their community.

**Q. Do you feel your business community could grow as a result of increased broadband connectivity?**

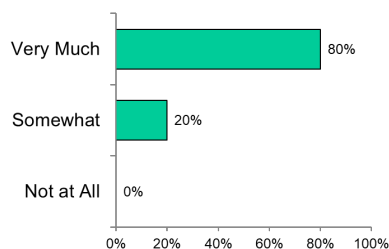


Figure 104 – Increased broadband connectivity's impact on growth of business' business community.

The GROWTH Alberta region offers convenient access to the major energy centres in the North and is well positioned near major corridors for access to other parts of North America.<sup>136</sup> The Swan Hills Treatment Centre is a world-class waste treatment facility. It processes all wastes with the exceptions of pathological, explosive, and radioactive materials.

### 9.1.2 Municipal and First Nations Broadband Interests

Communities within GROWTH Alberta are at different stages in recognizing the importance of broadband services and connectivity to economic diversification, municipal sustainability, regional competitiveness, public service delivery, and quality of life.<sup>137</sup>

Woodland County has been interested in improving cellular and Internet coverage for its community for a number of years, however, population density and terrain (trees) pose challenges. They have investigated building towers for ISPs to use (May 2016 timeframe, they were going to build three towers with help from an *Alberta Community Partnership (ACP)* grant (\$350,000 of the total cost \$850,000)). In the fall of 2016, the County decided to hold off on building their own towers and see how TELUS' new 700 MHz

<sup>136</sup> GROWTH Alberta; 2017-02-15.

<sup>137</sup> The five elements of broadband's importance were identified by the Calgary Regional Partnership, Economic Prosperity Steering Committee, *Request for Decision*; 2016-09-08.

technology, using SmartHubs, would penetrate mobility and Internet coverage dead spots. One option now being considered is to construct fibre access in the shadow areas and use point-to-point radios for backhaul from each area.

Whitecourt is in the preliminary stages of designing their fibre-based Wide Area Network, linking the Town's buildings and facilities. Wireless solutions will be deployed for remote facilities, where fibre solutions are cost prohibitive. Communications infrastructure will be going into their new residential development of Athabasca Flats East.

Table 39 identifies the awareness and current state of municipal involvement and interest in broadband and fibre network deployments. Most municipalities in the GROWTH Alberta region are at a relatively early stage, except for the Town of Whitecourt and Woodlands County. Whitecourt plans to deploy their own wide area network in 2017. Since about 2014, Woodlands County has been searching for a solution to fill broadband coverage gaps, which exist in their county.

Table 39 – GROWTH Alberta Involvement & Interest in Broadband<sup>138</sup>

Community	Enthusiastic	Interested 'Maybe'	Need Help Too Small	Too Expensive	Status Quo	Don't Know <sup>139</sup>	No Response <sup>140</sup>
<b>Towns</b>							
Barrhead						X	
Mayerthorpe			X	X	X		
Onoway							X
Swan Hills	X						
Westlock (TELUS Fibre)					X		
Whitecourt							X
<b>Villages</b>							
Alberta Beach							X
Clyde							X
Wabamun		X					
<b>Counties/MDs</b>							
Barrhead			X				
Lac Ste. Anne	X						
Westlock							X
Woodlands	X						
<b>First Nations</b>							
Alexis Nakota							X

<sup>138</sup> Communities were asked to rate their involvement and interest in broadband. Broadband was defined as follows: In telecommunications, broadband is a wide bandwidth data transmission with an ability to simultaneously transport multiple signals and traffic types - the medium can be twisted-pair copper wiring, optical fibre, coaxial cable, or radio. Broadband service is characterized as offering symmetric bandwidth between 50 Mb/s and 1 gigabit (Gb/s)/1,000 Mb/s and higher (really unlimited bit rates) (symmetric meaning the upload bit rate is as fast as the download bit rate).

<sup>139</sup> Don't Know – the respondent was unable to rate their community's interest and involvement in broadband.

<sup>140</sup> No Response – the community did not respond to the inquiries regarding their community's interest and involvement in broadband.

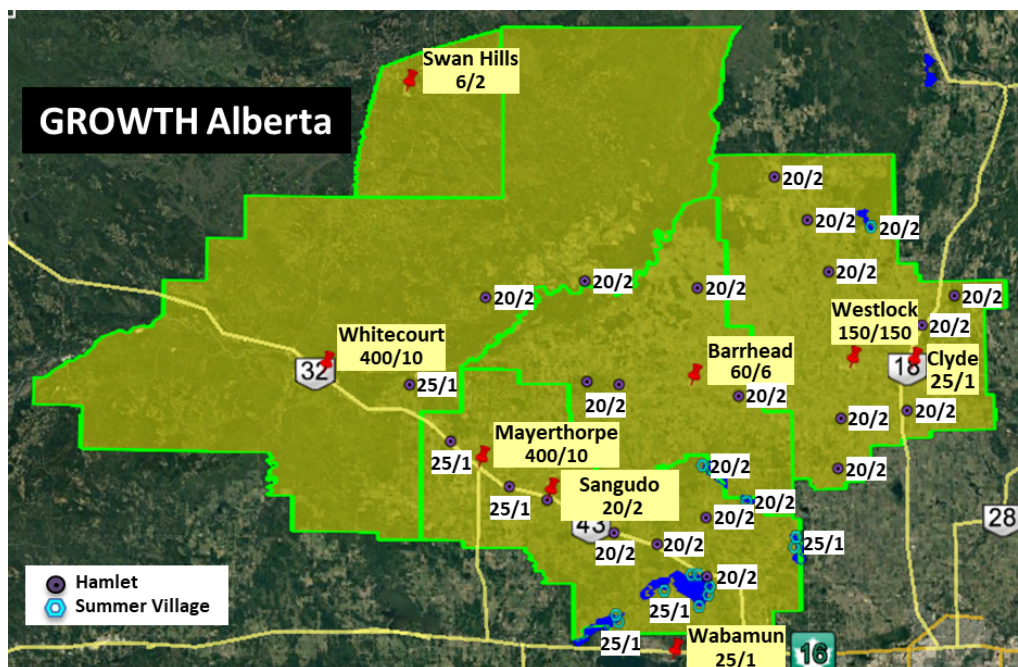
### 9.1.3 Current Service Providers, Services, and Infrastructure

#### 9.1.3.1 Fixed Wireless-based

Current Internet Service Providers using fixed wireless technology in the GROWTH Alberta region include the following:

- Alberta Communications Cable Services,
- Arrow Technology Group,
- Broadband Surfer,
- Clearwave Broadband Networks,
- Corridor Communications (CCI),
- First Broadband,
- MCSNet,
- Slave Lake Communications,
- Tera-Byte Wireless,
- Whitecourt Communications, and
- XplorNet (fixed wireless and satellite-based).

The advertised maximum download and upload ‘up to’ speeds (expressed in Mb/s) available for the residential market in both the urban and rural areas are shown on Figure 105. Speeds available in Swan Hills are a stark contrast to those available in the other urban centres. As well, speeds available in the smaller urban centres and rural areas of the REDA are significantly lower compared to those in the larger urban centres. Other than Eastlink’s higher speeds in Mayerthorpe and Whitecourt, most Internet service offerings cost approximately \$100 or less. Eastlink’s top tier offerings are priced higher. Appendix 16.2 provides the details of the service offerings (Internet only – no bundling unless otherwise stated) and geographic coverage. The coverage maps of the individual service providers are those that were available on their websites at the time of the writing of this report.

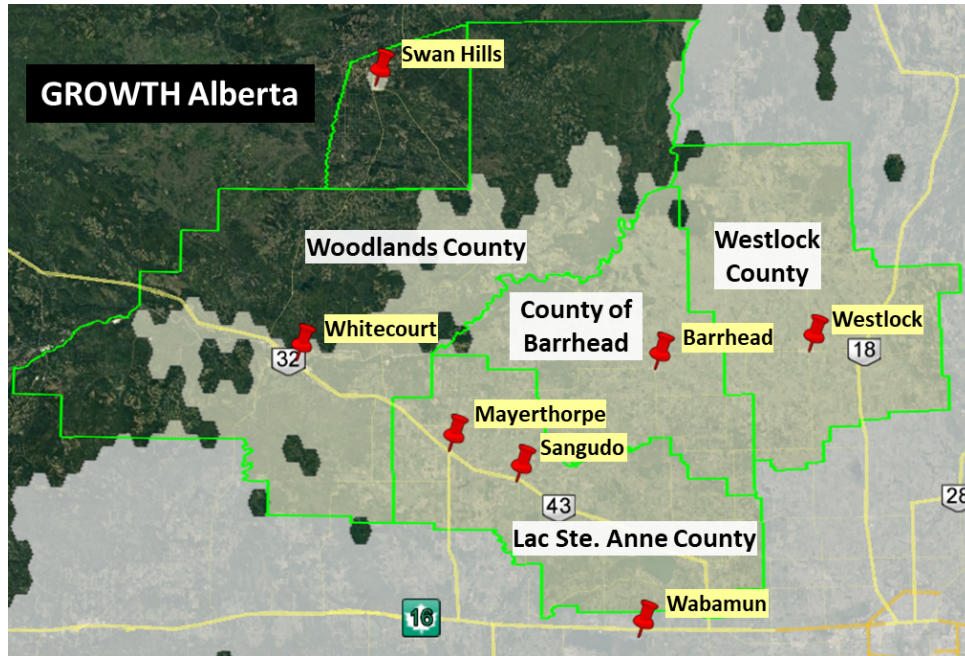


Some customers in GROWTH Alberta are successfully using the SmartHub. Internet download and upload speeds are expressed in Mb/s. There are a number of issues that determine whether a customer can actually attain the speeds identified (e.g., line-of-sight, the number of clients being served on the network or by a tower, time of day).

Figure 105 – GROWTH Alberta – advertised maximum residential download/upload speeds.

According to the CRTC website<sup>141</sup>, minimal 5 Mb/s down (toward the end-client) by 1 Mb/s up (from the end-client to the network) service is almost ubiquitously available throughout the GROWTH Alberta region, except for the Swan Hills area. A combined view of the fixed wireless coverage is shown in Figure 106 (light gray areas).

XplorNet Communications' (XplorNet's) new satellites will allow them to offer download speeds of 25 Mb/s across their customer base by July 2017.



Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 106 – GROWTH Alberta fixed wireless coverage.

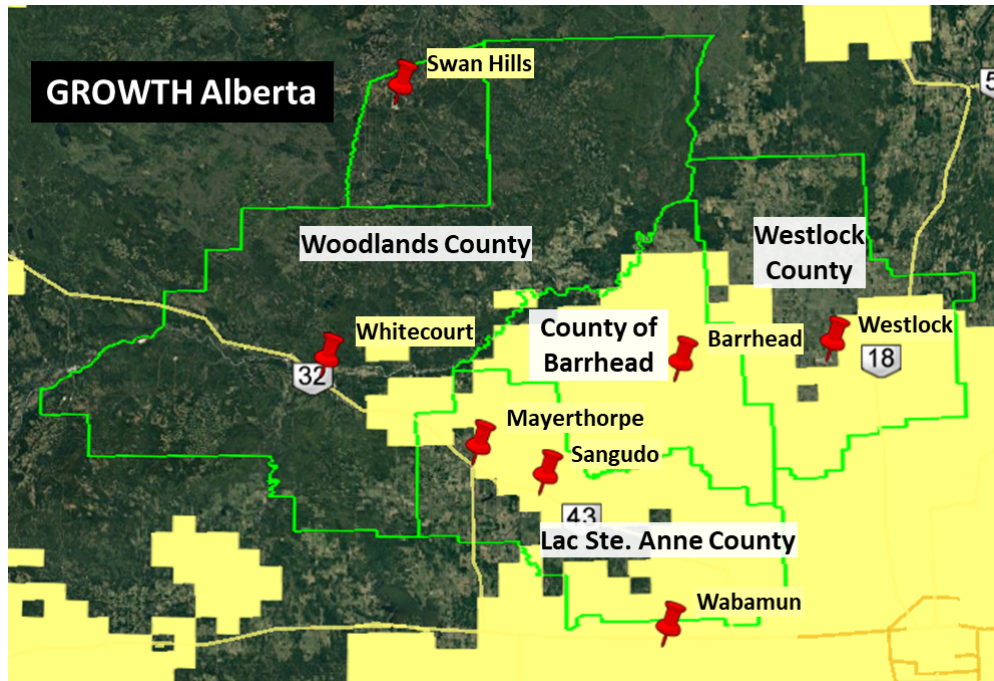
### 9.1.3.2 Mobility

Shown as yellow areas in Figure 107, mobility data services are available from TELUS/Bell and Rogers. Appendix 16.4.2 provides the coverage maps for each of the providers of mobility services. As discussed earlier Bell, TELUS, and Rogers are now using cellular towers and SmartHubs to provide Internet services.

### 9.1.3.3 Wireline-based – DSL

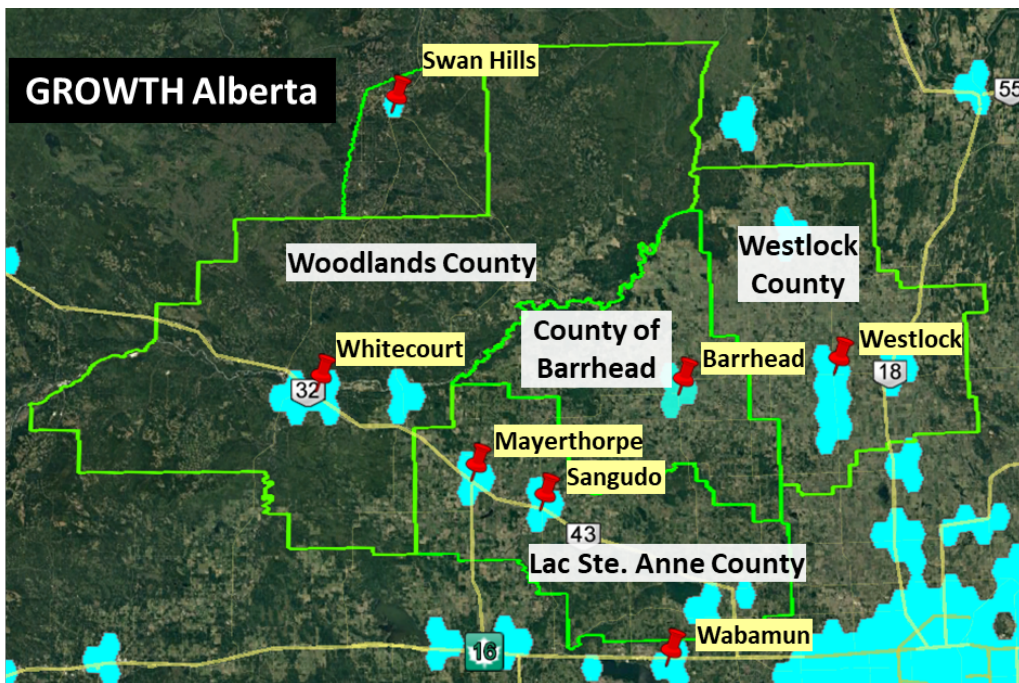
Digital Subscriber Line (DSL) refers to a group of last mile technologies that are used by wireline-based service providers such as TELUS in Alberta to provide broadband services over twisted-pair copper wiring. The local copper wire loop is a remnant from the days when (and how) the telephone company connected residential and business premises to the telephone company's network for the purposes of providing local and long distance telephone services (and dial-up Internet services). Since DSL's performance degrades with distance, the technology is only deployed in urban areas where access distances are less than about two miles. In Figure 108, areas served via DSL technologies are shown in blue.

<sup>141</sup> <http://crtc.gc.ca/eng/internet/internetcanada.htm>



Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 107 – GROWTH Alberta mobility data coverage.



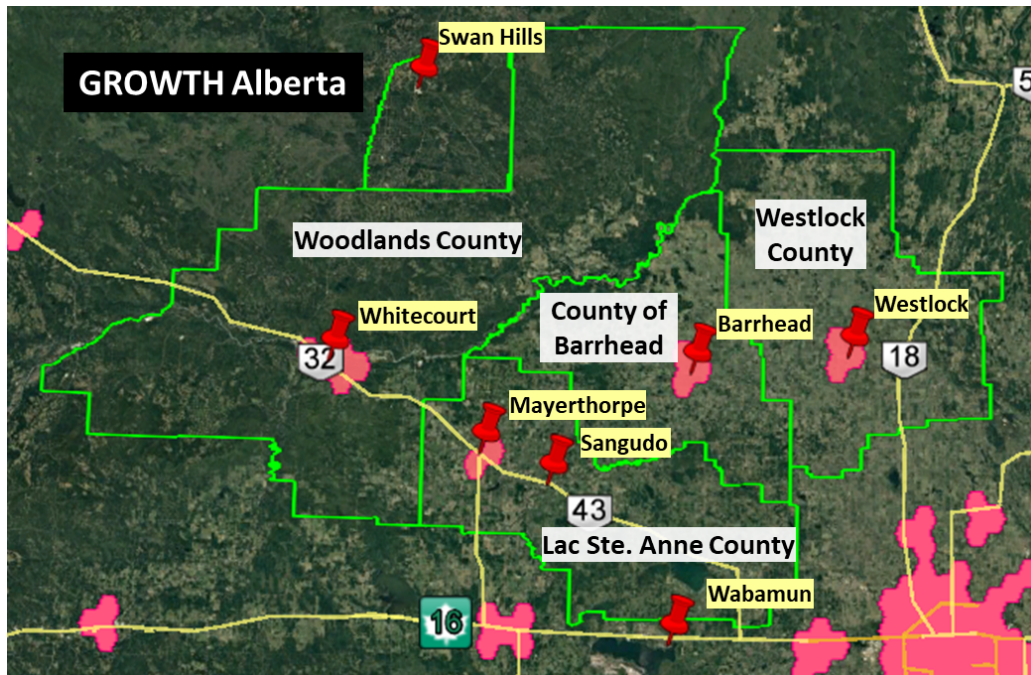
Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 108 – GROWTH Alberta DSL coverage.



### 9.1.3.4 Wireline-based – Coaxial Cable

Eastlink and Shaw Communications (Shaw), originally television broadcast companies, use coaxial cable and modern cable modem technology to provide broadband services in the GROWTH Alberta region (red areas in Figure 109). The cable companies currently use the DOCSIS 3.0 standard to achieve broadband speeds of 100 Mb/s or more over coaxial cable. Shaw expects to complete its DOCSIS 3.1 upgrade by the end of August 2017.<sup>142</sup> According to the Cybera, *State of Alberta Infrastructure Report*, “The next-generation DOCSIS 3.1 standard is expected to revolutionize hybrid fibre-coaxial cable connections by providing up to 10 Gb/s download and 1 Gb/s upload network throughput and significant improvements in latency.”<sup>143</sup>



Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 109 – GROWTH Alberta coaxial cable coverage.

Maximum advertised wireline offerings are shown in Appendix 16.3. Since these are ‘up to’ bit rates, during high usage periods, actual bit rates will be less – Eastlink and Shaw more so than TELUS due to the way the aggregation is implemented. In both cases, the offerings are highly asymmetric – upload and download bit rates differ significantly.

### 9.1.3.5 Internet Service Provider Wi-Fi

TELUS, Shaw, and Bell WiFi services are available in the GROWTH Alberta region. In Westlock, TELUS offers three locations compared to Bell’s single location. There are 19 TELUS and four Bell locations in Whitecourt. Bell offers a single WiFi location in Valleyview. Shaw offers 26 Go WiFi locations in Barrhead and another 26 locations in Westlock.

<sup>142</sup> Shaw Announces Third Quarter and Year-to-Date Results.

<sup>143</sup> *State of Alberta Digital Infrastructure Report*; Cybera; 2016-09-13.

### 9.1.3.6 Axia Fibre

Axia NetMedia provides retail services to corporate clients and, through AxiaConnect, provides fibre-based retail Internet services in a number of smaller communities. In exchange for access to a community's rights-of-way, Axia will consider investing in fibre-to-the-premise (FTTP) infrastructure in communities that can demonstrate that at least 30% of its residences and businesses are interested in purchasing Internet services from Axia once the 'closed-access' network is built. To date, Axia has not announced any plans for FTTP deployments in any GROWTH Alberta community.

## 9.1.4 Backhaul Availability

### 9.1.4.1 Alberta SuperNet

The extent of the SuperNet within the GROWTH Alberta region is shown in Figure 110. The green lines represent the Bell-operated BAN portion while the blue lines represent the Axia-operated EAN segments. A more general discussion about the SuperNet is presented in Appendix 16.5.



Figure 110 – GROWTH Alberta SuperNet infrastructure.

### 9.1.4.2 Shaw Wholesale

Given the uncertainty associated with the next iteration of the SuperNet contract by June 30, 2018, municipalities, First Nations, and Métis Settlements requiring access to fibre transport for backhaul to Edmonton may want to approach Shaw, Bell, or TELUS. Shaw has fibre to Westlock.

### 9.1.4.3 TELUS Wholesale

Except under a non-disclosure agreement, TELUS does not provide maps of fibre assets.

#### 9.1.4.4 Hybrid Wireless

Hybrid Wireless offers scalable high-speed Internet solutions - both dedicated and burstable solutions to meet business needs. Hybrid Wireless also offers support fibre for remote locations across Western Canada.

### 9.1.5 Existing Infrastructure

#### 9.1.5.1 Tower and Other Tall Structures

When planning a broadband build-out it is important to build on what is already in place. The key inquiry for the current state analysis is what assets does the community have that can be provided at little or no incremental cost that improve the economics of the broadband deployment and operations? Assets include existing towers, fibre and community networks, which the community might be using for communications or asset management. Existing and possible access to tall structures or buildings are also important to inventory for potential placement of wireless equipment.

In the 2012 to 2013 timeframe, Lac Ste. Anne County received a \$500,000 grant from the Alberta Agriculture and Forestry *Final Mile Rural Community Program*. Table 40 shows existing MD- and county-owned tower infrastructure.

Table 40 – GROWTH Alberta Existing MD- and County-owned Towers

	Towers	Details
Barrhead	2	1, 70' at public works shop; 1, 30' at Town of Barrhead office building
Lac Ste. Anne	6	Own fibre to their Darwell, Glenevis, and Mayerthorpe towers and from the SuperNet point-of-presence in Sangudo to the County's new office site, which is two kilometres east of Sangudo
Wabamun	4	3, small on pump houses (line-of-sight would be an issue); 1, on water plant
Woodlands	?	Unclear if they own towers

Various towns and villages identified other tall structures that could potentially be leveraged for community broadband. They include the following:

- Mayerthorpe – RCMP detachment communication tower; emergency response building hose tower;
- Onoway – 2, 30' radio towers located at the town administration building;
- Swan Hills – 1, 100' tower (is in good condition and located at the town office);
- Westlock – tall buildings: Westlock Place apartment building; Spirit Centre Multiplex (for the placement of broadband equipment); and
- Alberta Beach – 2 towers (currently use for patrol department at administration building; for fire services department at village fire hall).

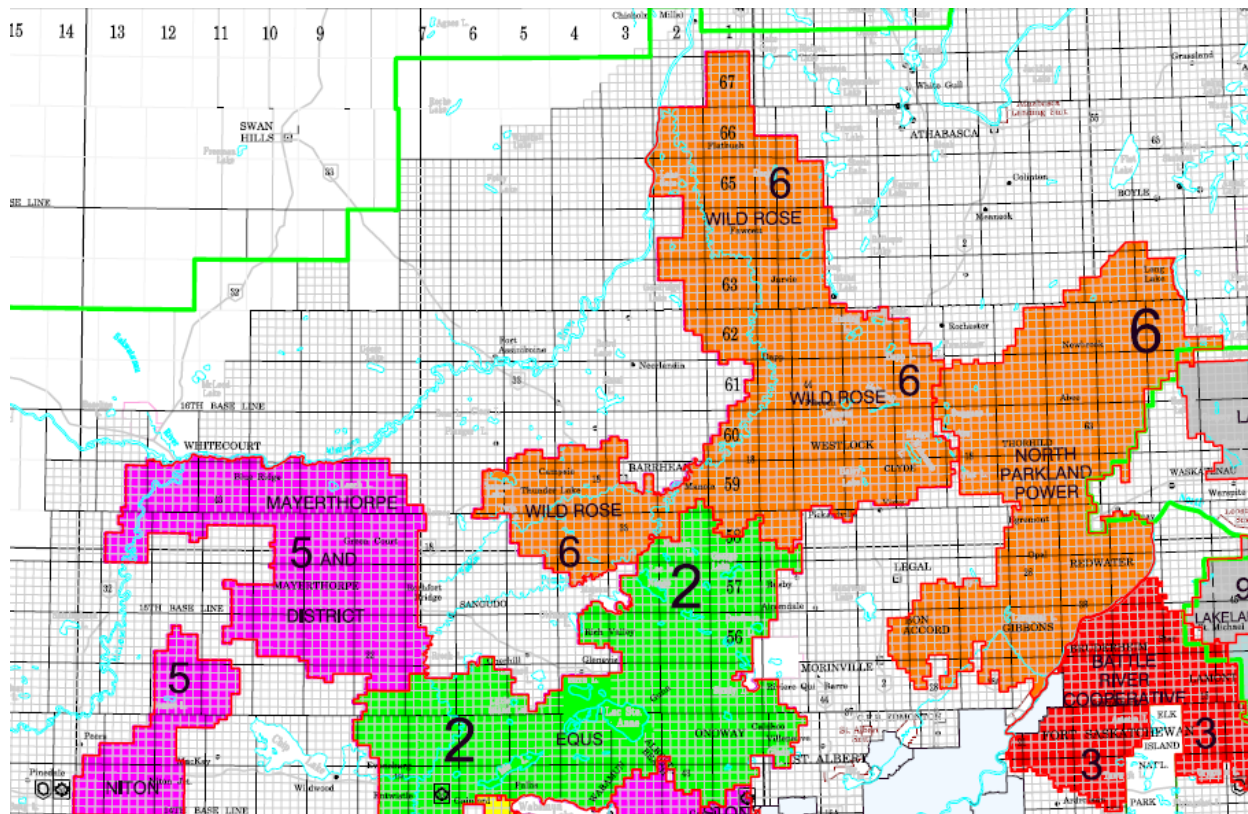
#### 9.1.5.2 Utility Infrastructure

The existing overhead and underground transmission and distribution lines of electric utility companies (ATCO, Fortis), REAs, and natural gas co-operatives (co-ops) present deployment options for community broadband builds - access to and installing fibre cables to travel along utility poles, in ducts and conduit, and along rights-of-way can significantly improve the economics of broadband service expansion projects and network deployments. Inquiries about the availability of communications spaces on utility providers'

poles and where multi-party trench agreements exist will be made during the preliminary infrastructure design phase of a broadband network.

### 9.1.5.3 Rural Electrification Associations (REAs)

REAs are member-owned electric distribution systems that provide electricity service to farm members within a specific geographic boundary. Each REA has an elected board of directors that is responsible for the business operations of the REA. Construction, operations, and maintenance is done by the investor-owned electric utility company (through contracts with the REAs) for the EQUUS REA Ltd., Mayerthorpe & District REA Ltd., and the Wild Rose REA Ltd. Figure 111 shows their respective service areas



Source: Rural Electrification Associations Service Areas. Accessed Nov. 2016.

Figure 111 – GROWTH Alberta REA service areas.

Appendix 16.6 shows ATCO Electric's and Fortis Alberta's respective service areas in northern Alberta. REA and distribution company systems are intertwined in the REA service area as shown in Figure 112, and they work together to ensure there is reliable service and no duplication of distribution lines and service.<sup>144</sup> In Alberta, most rural areas are radial networks. A radial distribution line may serve both distribution entity and REA customers and different parts of the same line maybe owned by one or the other party.

<sup>144</sup> Alberta Utilities Commission (AUC); *Notice of Hearing, Application 21148-A001*.

### 9.1.5.4 Gas Co-operatives – Zone 2

In the 1960s, non-profit gas co-ops were formed to supply natural gas to rural Alberta - franchise areas were designated. The following three Zone 2 gas co-ops currently operate in the GROWTH Alberta region. Figure 112 provides a map showing the group's geographic coverage.

- Pembina River Natural Gas Co-op Ltd. (Jarvie, Alberta – Westlock area)
- Ste. Anne Natural Gas Co-op Ltd. (Onoway)
- TRL Gas Co-op Ltd (Whitecourt)



Source: Federation of Alberta Gas Co-ops, <http://www.fedgas.com/Map>. Accessed Feb. 1, 2017.

Figure 112 – GROWTH Alberta gas co-operatives.

## 9.1.6 Planned Infrastructure

### 9.1.6.1 Major Projects

The GROWTH Alberta region has several private and public sector capital projects planned. Where possible these projects maybe leveraged to reduce the costs associated with the deployment of broadband infrastructure. Figure 113 shows the capital projects in GROWTH Alberta valued at \$5 million or greater.<sup>145</sup>

### 9.1.6.2 Electricity Transmission Development Plans

Construction of a major electricity transmission line, the Fort McMurray West 500 kV, is scheduled to begin in summer 2017. It is being built by Alberta PowerLine, a partnership between ATCO and Quanta Services.<sup>146</sup> The line will run from Wabamun to the Fort McMurray area, and is designed to help meet increased electricity demand in the Fort McMurray area. The line will pass through the GROWTH Alberta region (construction south of the Athabasca River will begin in 2018). Appendix 16.9 shows a map of the route, which was approved on February 10, 2017. The facilities will be completed and operational by June 2019.

<sup>145</sup> Alberta Major Projects, Economic Development and Trade; 2017-08. <http://majorprojects.alberta.ca/>.

<sup>146</sup> Alberta PowerLine; 2017-03-24. [www.albertapowerline.com](http://www.albertapowerline.com).

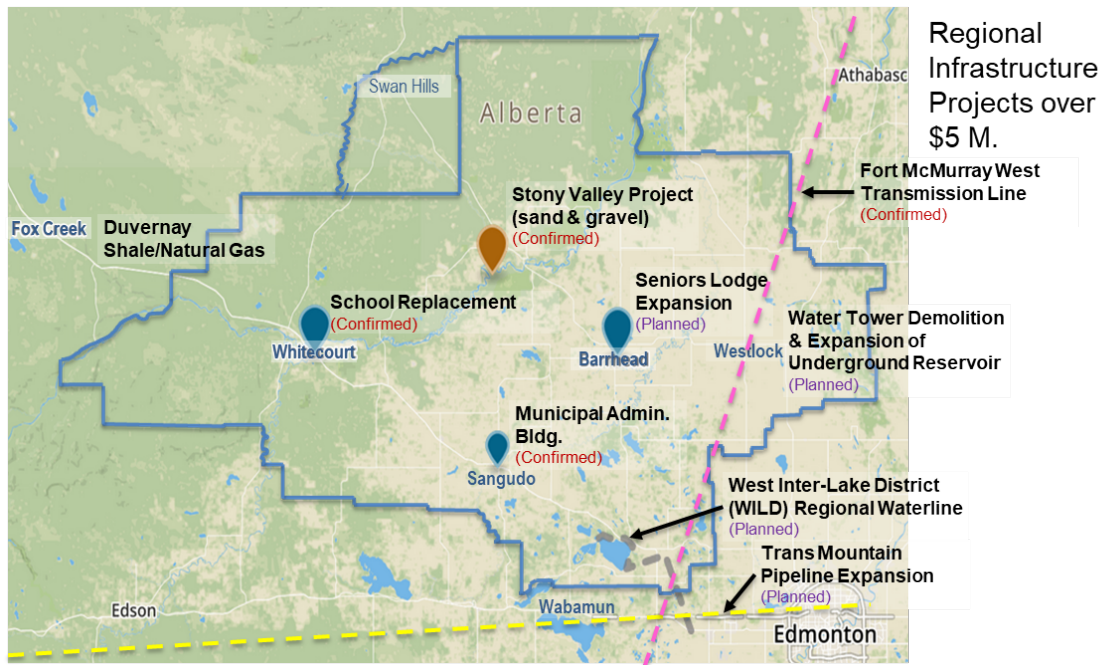


Figure 113 – Major projects – GROWTH Alberta.

### 9.1.6.3 Municipal Capital and Civil Works Projects

Leveraging civil infrastructure projects can reduce broadband deployment costs by 75%. Given civil infrastructure costs typically account for 70% of buried deployment costs, this is significant. Capital projects that involve trenching or erecting towers or poles such as during the development of new subdivisions, road construction, or the construction or rehabilitation of water or sewer lines are typical projects that can improve the economics of community broadband projects.

Onoway received a total of \$1.6 million for sanitary sewer forcemain replacement from Alberta Transportation's *Alberta Municipal Water/Wastewater Partnership (AMWWP)*. Lac Ste. Anne also received funding – for the Darwell effluent disposal line (\$2.2 million).

The Federal *Small Communities Fund* (part of the New Building Canada Fund) for infrastructure projects, now includes a 'Connectivity and Broadband' category. 2016 approved non-broadband projects within the Barrhead area include (figures shown are the Total Eligible Project Cost - Federal, Provincial, and Municipal):

- Mayerthorpe – Interim production well and associated works \$2 million,
- Whitecourt – Water system upgrading \$6.7 million, and
- Westlock County – Water treatment plant and supply system upgrading – Hamlet of Jarvie \$1.9 million.

The Federal *Clean Water and Wastewater Fund (CWWF)* provided funding of \$3.2 million to the Westlock Regional Water Services Commission for Phase 3 of the Westlock to Fawcett water transmission line. Phase 2 of the West Inter-Lake District (WILD) Water Commission's water transmission extension project will supply potable water to Onoway, the Lac Ste. Anne County summer villages, Alberta Beach, and the Alexis Nakota First Nations. Federal funding for this phase was \$10 million while provincial funding was

approximately \$7 million.<sup>147</sup> Extensions to the summer villages of Seba Beach, Sandy Beach, and Nakamun Park will comprise Phase 3 of this project.<sup>148</sup>

Table 41 shows the capital and civil works projects that either the municipalities self-reported or were identified by another source. TELUS has made a fibre investment to the home/premise in Town of Westlock.

Table 41 – GROWTH Alberta Municipal Capital & Civil Works Projects

Towns	
Barrhead	<ul style="list-style-type: none"> <li>AltaGas Utilities upgrading natural gas distribution (confirmed 2017)</li> <li>Preliminary engineering to take place for water reservoir and lagoon upgrades (planned)</li> </ul>
Mayerthorpe	<ul style="list-style-type: none"> <li>Highway commercial development (20 lots, shallow utilities to be installed)</li> <li>Manufactured home subdivision (8 lots, spring 2017)</li> <li>Potential residential development (Phase One – 21 lots)</li> <li>Street paving (summer 2017)</li> <li>Water main rehabilitation (summer 2017)</li> </ul>
Onoway	Reconstruction of sewer main (spring-summer 2017)
Swan Hills	<ul style="list-style-type: none"> <li>Sanitary sewer improvement (confirmed spring-summer 2017)</li> <li>11-lot industrial/commercial development (planned)</li> </ul>
Westlock	<ul style="list-style-type: none"> <li>Road work</li> <li>Potential commercial subdivision (26 acres)</li> <li>Westlock Regional Water Services Commission water line from the Town of Westlock to the Hamlet of Fawcett within County of Westlock</li> </ul>
Whitecourt	<ul style="list-style-type: none"> <li>Athabasca Flats East development (winter to spring 2017) - shallow utilities</li> <li>Phase 3 of fibre Wide Area Network (2017)</li> </ul>
Villages	
Alberta Beach	Storm drainage
Clyde	Did not respond to project inquiries and no information was available on the village's website
Wabamun	<ul style="list-style-type: none"> <li>Re-subdividing a former housing site into a 42-lot subdivision (41 single homes and 35 condo units), underground electrical to be installed (other utility services are already in place) (spring 2017)</li> <li>400 plus lot waterfront development (planned)</li> </ul>

<sup>147</sup> *Ministers Announce Clean Water Coming to Alexis*; Mayerthorpe Freelancer; 2017-07-10.

<sup>148</sup> West Inter-Lake District (WILD) Regional Water Services Commission Opening Ceremony, Parkland County website <https://www.parklandcounty.com/Modules/News/index.aspx?feedId=751d9bfa-fef1-4f2d-8753-b63088db86eb&newsId=e6469a23-9619-4244-b82d-e5de11e72c15>; 2016-06-10; 2017-08-09.

Counties	
Barrhead	<ul style="list-style-type: none"> <li>• Barrhead to Thunder Lake/Campsie regional water transmission line</li> <li>• Water transmission for Barrhead, Lac Ste. Anne, and the summer villages of Birch Cove and Nakamun Park</li> <li>• Various annual road construction projects</li> <li>• Industrial Park (160 contiguous acres) confirmed – interest in fibre expressed</li> <li>• Kiln replacement (addition to building) confirmed</li> </ul>
Lac Ste. Anne	<ul style="list-style-type: none"> <li>• See second item under Barrhead County</li> <li>• Ongoing trenching projects</li> <li>• North 43 Lagoon Commission construction of sewer lines along northeast shore of Lac Ste. Anne</li> <li>• West Lake District Regional Water Services Commission construction of water line</li> </ul>
Westlock	Road rehabilitation, bridge replacement, water supply – industrial park <sup>149</sup>
Woodlands	Road and bridge construction <sup>150</sup>
First Nations	
Alexis Nakota	Did not respond to project inquiries and no information was available on the community's website

## 9.2 Desired State

The range of interest in broadband varies considerably throughout the region, but even the most enthusiastic of the municipalities are still in the early stages of deciding which options to pursue and how. While a formal 'Desired State' has not yet been agreed to in any of the municipalities, what follows is based on the assumption that, over the next five years, the majority may choose to facilitate the deployment of infrastructure to support a fully scalable broadband network ubiquitously available throughout their municipality and, if possible, the region as a whole. This would typically include a combination of an underlying fibre infrastructure with upgraded wireless services where fibre is not yet practical. Market-wise, the infrastructure would be available on an open-access basis to all service providers interested in serving municipal and regional businesses and residents. Whereas the municipalities do not wish to interfere with private enterprise in the services marketplace, they will entertain options relative to facilitating the underlying lit open-access fibre utility infrastructure.

The communities demonstrating the most interest in broadband in GROWTH Alberta and where near-term action is likely are as the following:

**Town of Swan Hills** – The Town of Swan Hills is a partner in the Big Lakes County *Inter-Municipal Broadband Discovery Project*, which is being led by Big Lakes and recently received funding from the *Alberta Community Partnership (APC) Program*. The project will assess the options available to enhance broadband in the region. With several oil and gas operations located in the Swan Hills area, Swan Hills is home to a number of industry field offices. The presence of high-speed Internet is a factor in retaining those offices and company bases within and near Swan Hills. Within three years the Town of Swan Hills envisions the initial deployment of broadband infrastructure and within a decade access to high-speed broadband would be assumed.

<sup>149</sup> Westlock County; 2017 Capital Budget.

<sup>150</sup> Woodlands County; 2017 Budget; 2017-03-13.



**Barrhead County** – Barrhead County would like to secure consistent Internet service levels and pricing for their residents and businesses – affordable is an important criterion as well. Recognizing their small size and their need to prioritize and align broadband capital expenditures with other infrastructure projects, the county is interested in devising a strategy and plan to achieve Internet access to all citizens and businesses within three years. The County is interested in learning what role especially rural municipalities should assume in achieving the CRTC’s targets of 50 Mb/s download and 10 Mb/s upload, with deployment targets of 90% of Canadian households by 2021 and 100% by 2031. They also welcome guidance on how to achieve these targets.

**Lac Ste. Anne County** – When people move to Lac Ste. Anne County (often from urban centres), they expect available broadband services to be comparable to the urban service levels they may have become accustomed to. Since 2010, the county Council has adopted a utility model for broadband expansion. Since that time, the county’s fixed wireless tower deployment has been funded through grant programs. It is anticipated that a similar strategy would be executed to fund fibre/broadband service to all unserved areas within five years.

The above communities are depicted in Figure 114. Appendix 16.11 provides further details about each of the community’s issues and challenges; whether fibre/broadband is on their Council’s agenda; the factors impacting their community’s capability to pursue a fibre/broadband initiative; and their 3-, 5-, and 10-year visions for broadband.

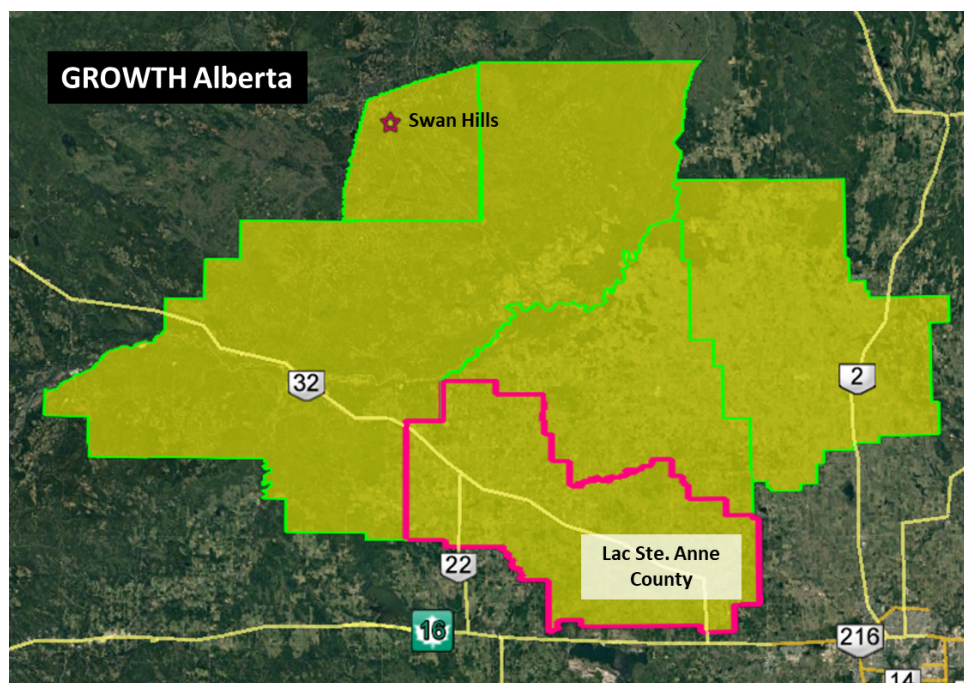


Figure 114 – Communities with near-term broadband plans.

## 9.3 Town of Whitecourt – A 4,250+ Premise Utility Network

### 9.3.1 Business Structure

Assume that the Town of Whitecourt deploys an open-access, lit fibre-optic network that will make world-class, fully scalable broadband infrastructure available to every home and business in the town. In the analysis below, the business structure, opto-electronics and backhaul, operations, drop capital, and markets and revenues assumed are those outlined in the default implementation scenario presented in

Section 6.5. In this case, the local network entity established to house the local fibre operation will be referred to as W-Net.

### 9.3.2 Deployment Capital

Assuming deployment conditions similar to those experienced in Olds, a buried fibre deployment that passes every residence and business in Whitecourt would cost about \$8.93M.

### 9.3.3 Deployment Schedule

The financials below assume that the network would be deployed throughout Whitecourt over a three-year period commencing spring, 2018 – a third of the town would be completed each year.

### 9.3.4 Opto-electronics and Backhaul

A breakdown of the capital expenditures over the first five years of operation appears in the pie chart in Figure 115. Capital cost estimates over the first five years of operation for the proposed scenario come to \$13.4M. In the chart, the \$9.32M outside plant (OSP) deployment estimate (core and drops) includes the feeder and distribution plant required to pass every premise and provide drop connections to those premises that take service.

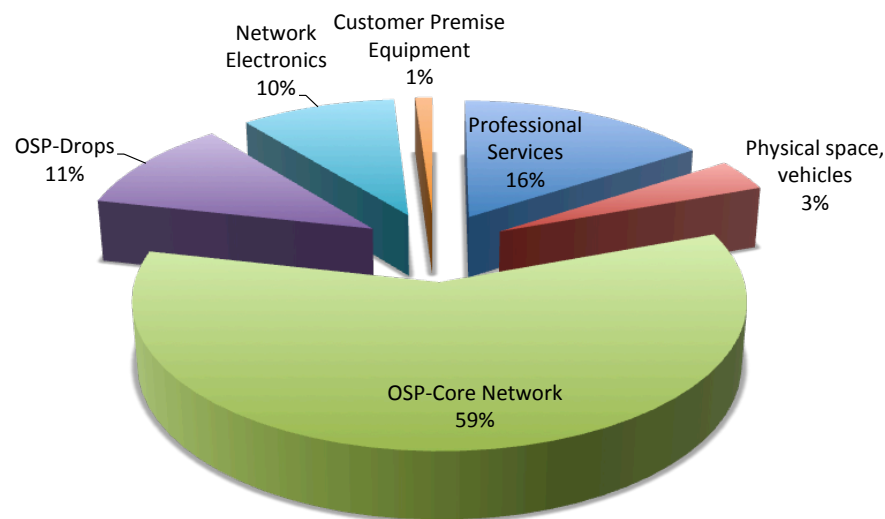


Figure 115 – Cumulative capital expenditures from 2018 to 2022.

### 9.3.5 Operations

The operational costs for wholesale network operation are straightforward as most are handled via outsourced contracts. Once the network build is completed in 2020 and the target penetration rates are realized, operational costs stabilize and a view of those calculated for 2024 are shown in Figure 116. In the chart, Admin, ops, o-e, and mktng refer to administration, operations, opto-electronics, and marketing respectively. The numbers assume that the Town provides both equipment and storage space at no charge.

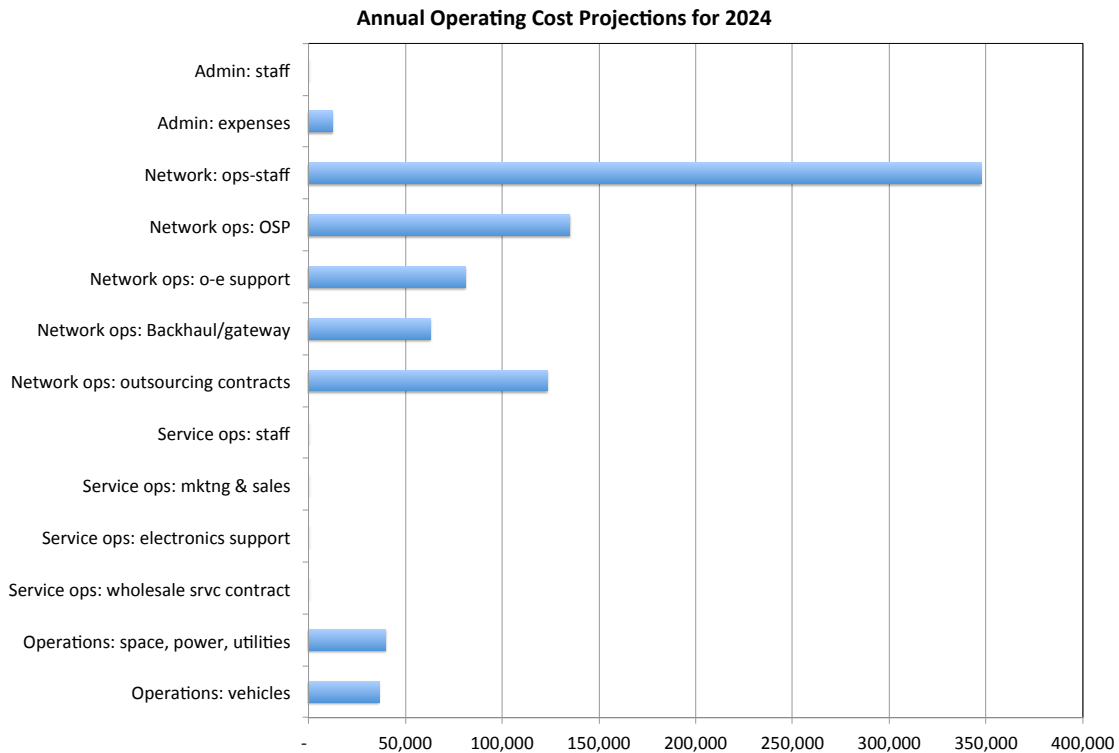


Figure 116 – Projected operational costs in 2024.

### 9.3.6 Financial Projections

Cashflow results for this scenario are summarized in Table 42. Though the operation goes cashflow positive in year 5 and, with debt servicing considered, the overall financials do go cashflow positive in year 7. As the required capital must therefore be sufficient to cover a 6-year deficit, some \$14.0M in capital will be required to fund the operation. By year 15, approximately \$561,587 is being returned to the Town annually.

Table 42 – Utility Model Results Summary for Whitecourt

	Results
Years to positive cashflow	
Operating	4
With debt servicing (p&i)	6
Financing	
Start-up capital required	14,047,080
Net Cashflow - before debt servicing	
Profit - annual at 10 yr	697,444
Profit - annual at 15 yr	1,060,028
Net Cashflow - after debt servicing	
Profit - annual at 10 yr	182,873
Profit - annual at 15 yr	561,587

In graphical form, the non-discounted cashflow chart for the proposed utility appears in Figure 117. The capital (red) required to finance the project is shown to pretty much all be required upfront during the network build and the financing must be sufficient to maintain a net cashflow of at least zero. Operational sustainability is determined by the gap or difference between the revenue (blue) and operational expenditure (green) lines whereas overall sustainability, which includes principal repayment, is the

difference between the revenue (blue) and the operational + principal repayment (dotted blue) lines. The bigger the gap, the better. The net overall cashflow line is the dotted orange line.

Though margins are slim during the network deployment, once the build completes, the operation goes cashflow positive and margins gradually increase. With sufficient financing, the endeavor would be financially sustainable.

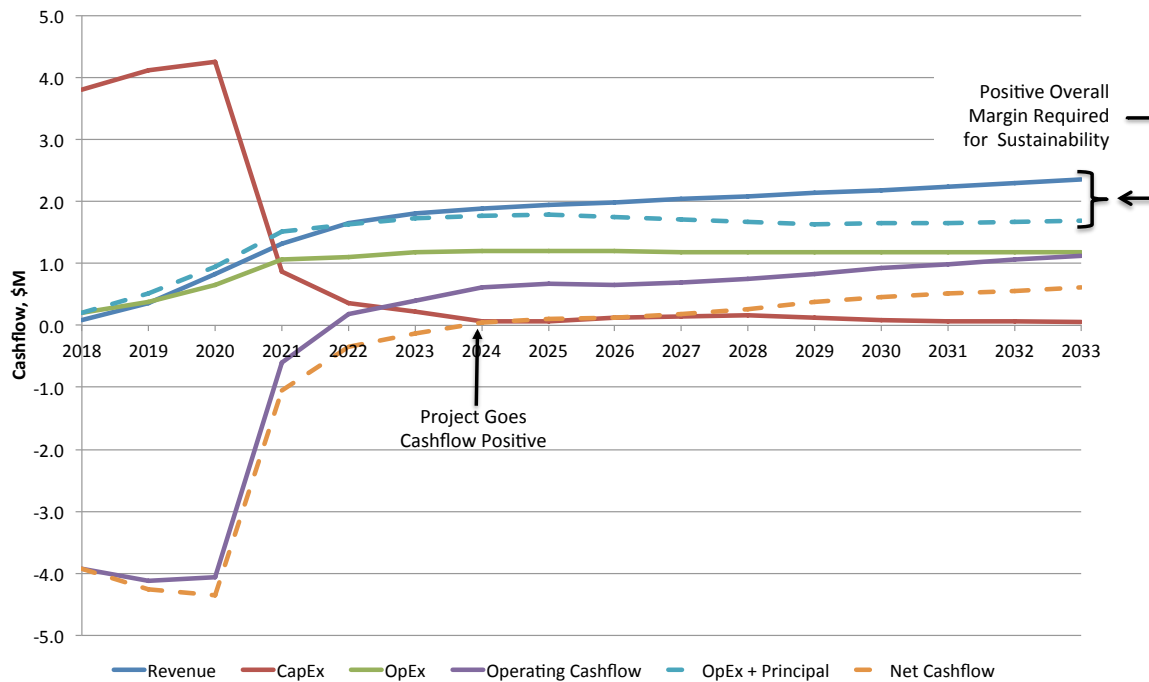


Figure 117 – Non-discounted cashflow projections for Whitecourt.

## 9.4 Town of Barrhead – A 2,000+ Premise Utility Network

### 9.4.1 Default Scenario

In the analysis for Barrhead below, the business structure, opto-electronics and backhaul, operations, drop capital, and markets and revenues assumed are those outlined in the default implementation scenario presented in Section 6.5. In this case, the local network entity established to house the local fibre operation will be referred to as B-Net. As Barrhead is half the size of Whitecourt, operational sustainability on a stand-alone basis will likely be an issue

### 9.4.2 Deployment Capital

Assuming deployment conditions similar to those experienced in Olds, a buried fibre deployment that passes every residence and business in Whitecourt would cost about \$4.22M.

### 9.4.3 Deployment Schedule

This business case assumes that the network would be deployed throughout the Town of Barrhead over a 2-year period commencing spring, 2018 – half of the town would be completed each year.

### 9.4.4 Opto-electronics and Backhaul

A breakdown of the capital expenditures over the first five years of operation appears in the pie chart in Figure 118. Capital cost estimates over the first five years of operation for the proposed scenario come to

\$6.65M. In the chart, the \$4.428M outside plant (OSP) deployment estimate (core and drops) includes the feeder and distribution plant required to pass every premise and provide drop connections to those premises that take service.

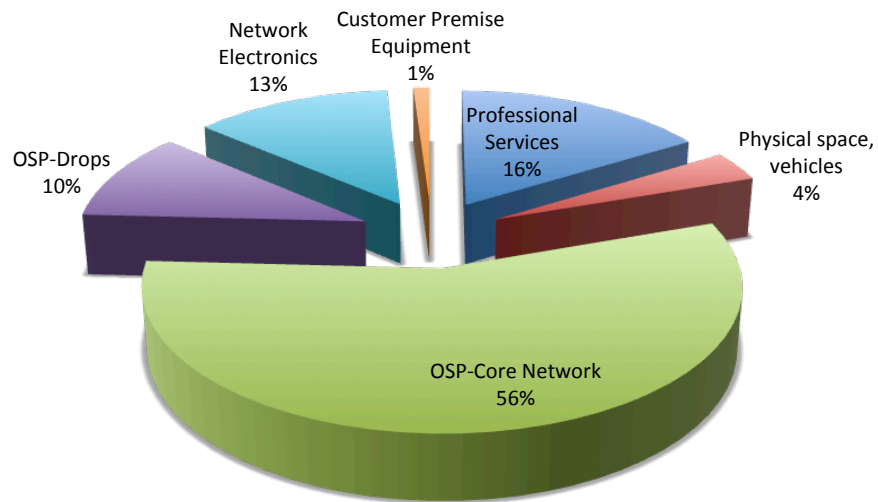


Figure 118 – Cumulative capital expenditures from 2018 to 2022.

#### 9.4.5 Operations

The operational costs for wholesale network operation are straightforward as most are handled via outsourced contracts. Once the network build is completed in 2018 and the target penetration rates are realized, operational costs stabilize and a view of those calculated for 2024 are shown in Figure 119. In the chart, Admin, ops, o-e, and mktng refer to administration, operations, opto-electronics, and marketing respectively. The numbers assume that the Town provides both equipment and storage space at no charge.

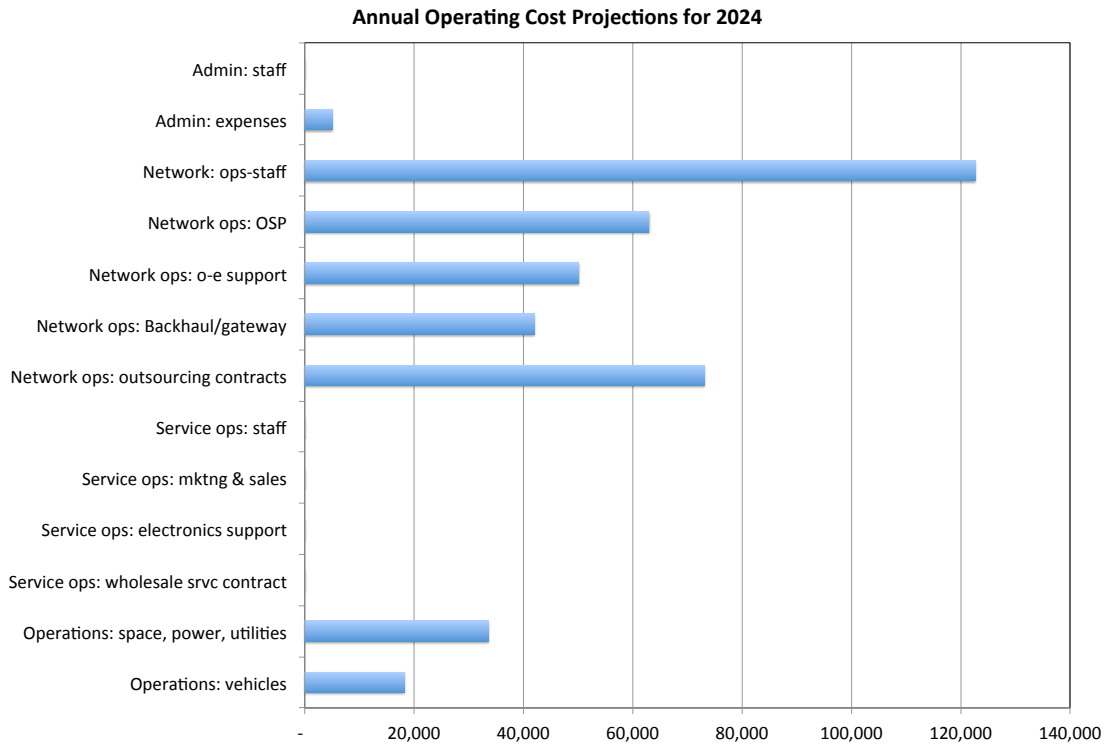


Figure 119 – Projected operational costs in 2024.

### 9.4.6 Financial Projections

Cashflow results for this scenario are summarized in Table 43. Though the operation goes cashflow positive two years after the network deployment completes, with debt servicing considered, the overall financials do not go cashflow positive until year 11. As the required capital must therefore be sufficient to cover an 11-year deficit, some \$7.6M in capital will be required to fund the operation. By year 15, approximately \$121,221 is being returned to the Town annually.

Table 43 – Utility Model Results Summary for Barrhead

	Results
Years to positive cashflow	
Operating	4
With debt servicing (p&i)	10
Financing	
Start-up capital required	7,578,553
Net Cashflow - before debt servicing	
Profit - annual at 10 yr	226,189
Profit - annual at 15 yr	389,971
Net Cashflow - after debt servicing	
Profit - annual at 10 yr	0
Profit - annual at 15 yr	121,221

In graphical form, the non-discounted cashflow chart for the proposed utility appears in Figure 120. The capital (red) required to finance the project is shown to pretty much all be required upfront and the financing must be sufficient to maintain a net cashflow of at least zero. Operational sustainability is determined by the gap or difference between the revenue (blue) and operational expenditure (green) lines whereas overall sustainability, which includes principal repayment, is the difference between the

revenue (blue) and the operational + principal repayment (dotted blue) lines. The bigger the gap, the better. The net overall cashflow line is the dotted orange line.

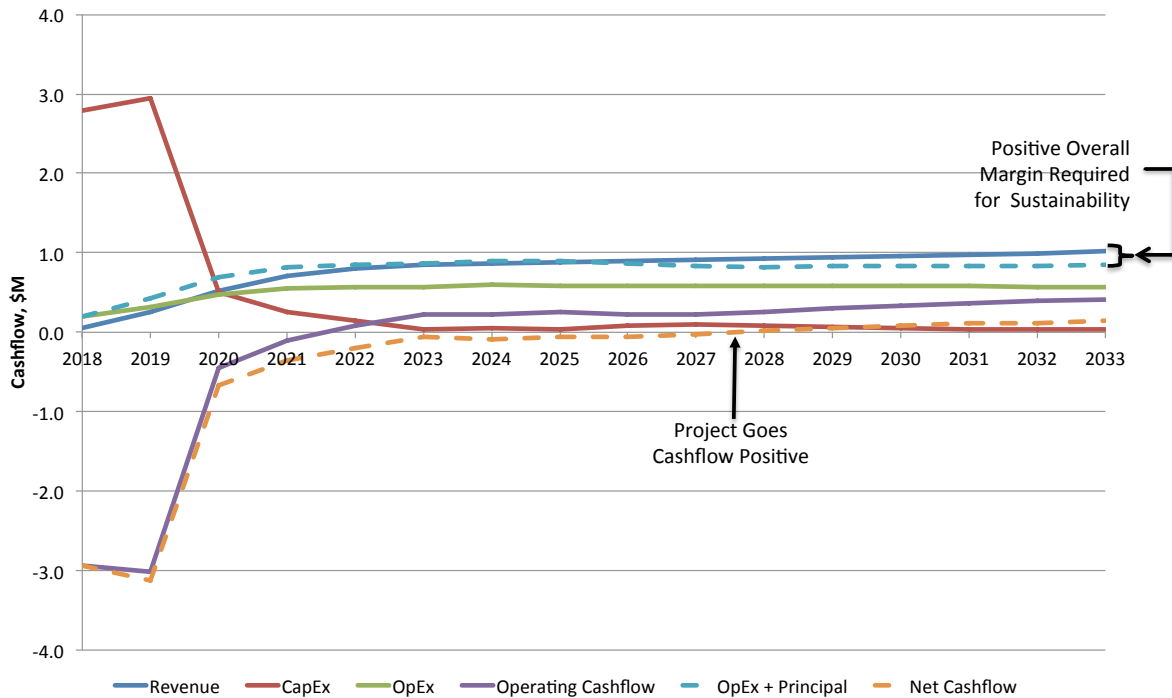


Figure 120 – Non-discounted cashflow projections for Barrhead.

The operating margin is positive in year 4 and, with debt service payments, the operation goes cashflow positive in year 12. While technically these numbers work, operationally, the risk is too high due to the negligible margins and resulting deficits. Given the small client base available in Barrhead and the importance of scale to operational sustainability, these initial results are typical for communities with populations less than around 4-5 thousand people.

Options to improve margins sufficiently that a community might elect to pursue a deployment are many and varied. With only 900 premises, for example, Valleyview now has a model in which their numbers work. Options to be considered are outlined in Sub-section 6.5.10.

## 9.5 Town of Swan Hills – A 725 Premise Utility Network

### 9.5.1 Business Structure

With 4,000+ premises, the stand-alone business case for an FTTP play in Whitecourt made financial sense. At half the population, the financials for Barrhead were marginal. With under half the population of Barrhead, the financials for Swan Hills are even worse, so partnering with other communities will likely be required.

In the analysis below, the business structure, opto-electronics and backhaul, operations, drop capital, and markets and revenues assumed are those outlined in the default implementation scenario presented in Section 6.5. In this case, the local network entity established to house the local fibre operation will be referred to as S-Net.

### 9.5.2 Deployment Capital

A pre-conceptual buried fibre design was completed for the Town of Swan Hills was complete as part of the Big Lakes Broadband project. The design appears in Figure 121. In the map, feeder lines are in magenta and the distribution cabling in cyan. The estimated deployment cost to pass every home and business is \$2.14M which comes to about \$2,300/premise.

### 9.5.3 Deployment Schedule

This business case assumes that the network would be deployed throughout Swan Hills over the spring, summer, and fall of 2018.

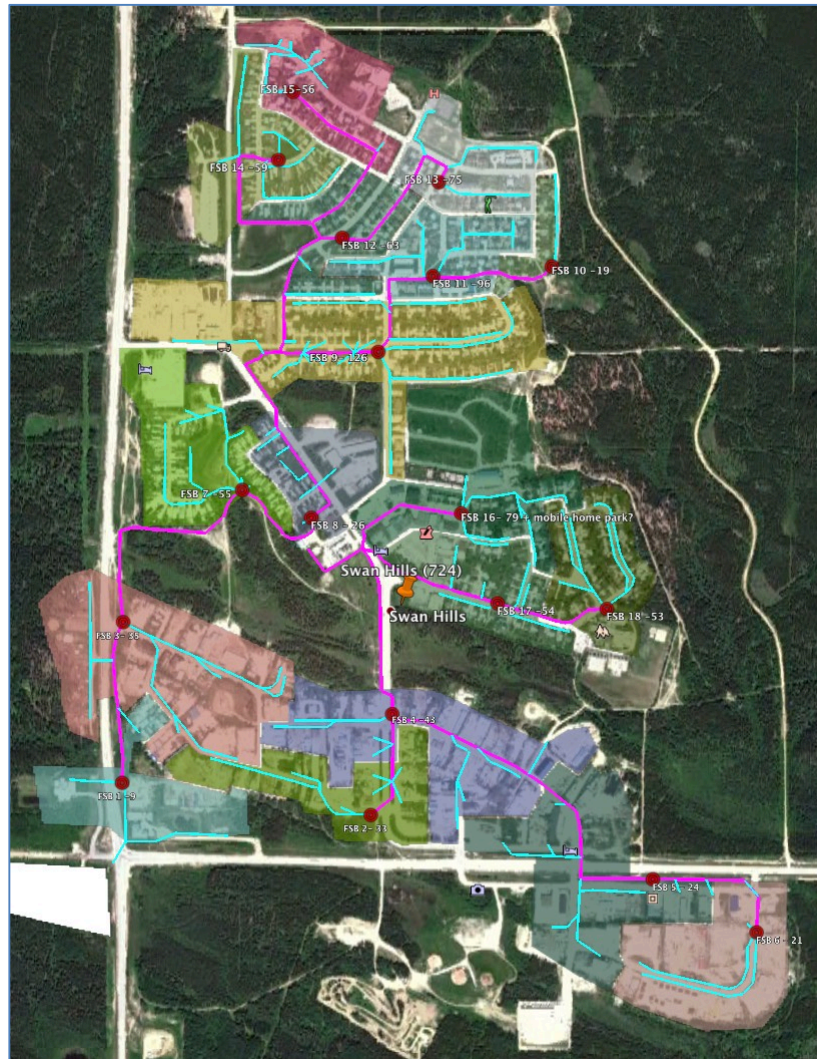


Figure 121 – A pre-conceptual fibre plan for Swan Hills.

### 9.5.4 Opto-electronics and Backhaul

Capital cost estimates over the first five years of operation for the proposed scenario come to \$3.47M – the breakdown appears in Figure 122. In the chart, the \$2.21M outside plant (OSP) deployment estimate (core and drops) includes the feeder and distribution plant required to pass every premise and provide drop connections to those premises that take service.



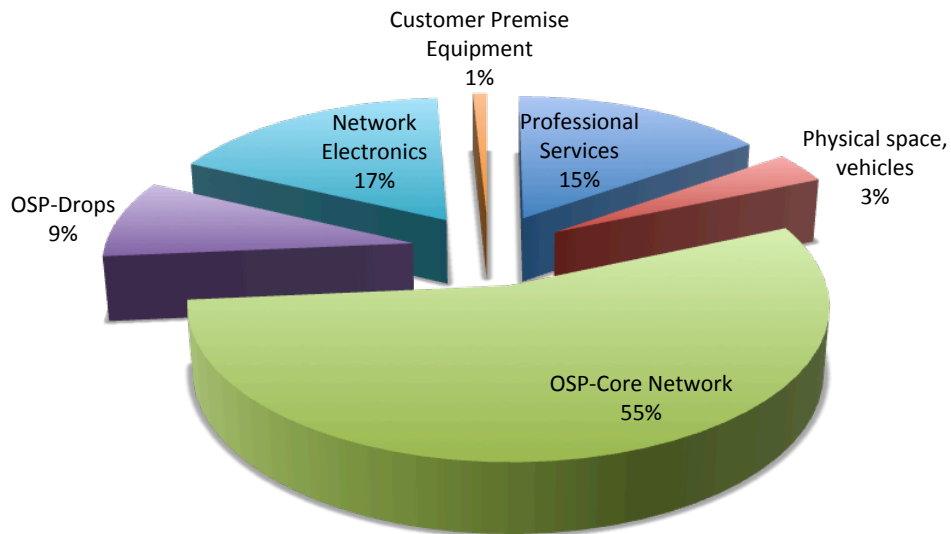


Figure 122 – Cumulative capital expenditures from 2018 to 2022.

### 9.5.5 Operations

The operational costs for wholesale network operation are straightforward as most are handled via outsourced contracts. Once the network build is completed in 2018 and the target penetration rates are realized, operational costs stabilize and a view of those calculated for 2024 are shown in Figure 123. The numbers assume that the Town provides both equipment and storage space at no charge.

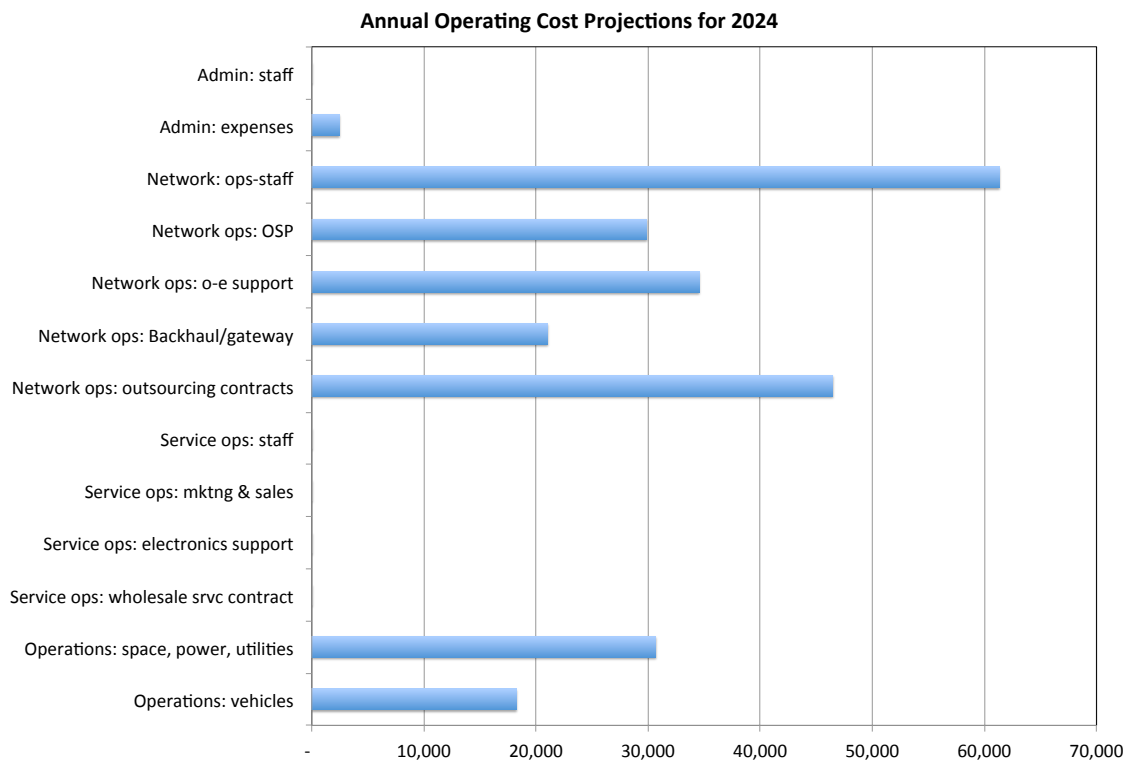


Figure 123 – Projected operational costs in 2024.

### 9.5.6 Financial Projections

In graphical form, the non-discounted cashflow chart for the proposed utility appears in Figure 124. The capital (red) required to finance the project is shown to pretty much all be required upfront and the financing must be sufficient to maintain a net cashflow of at least zero. Operational sustainability is determined by the gap or difference between the revenue (blue) and operational expenditure (green) lines whereas overall sustainability, which includes principal repayment, is the difference between the revenue (blue) and the operational + principal repayment (dotted blue) lines. The bigger the gap, the better. The net overall cashflow line is the dotted orange line.

As is evident, the client base in Swan Hills is insufficient to sustain the operation. The overall margin remains negative and the operation runs an on-going deficit.

Options to improve margins sufficiently that a community might elect to pursue a deployment are many and varied. Options to be considered were discussed in Sub-section 6.5.10.

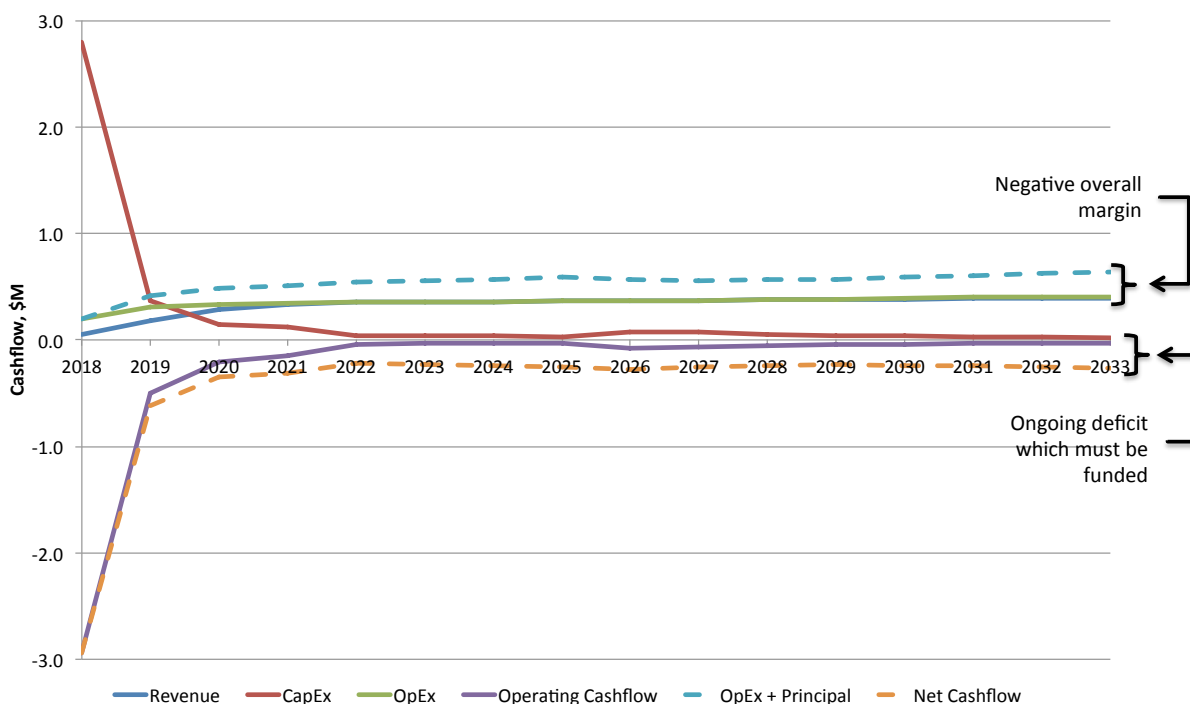


Figure 124 – Non-discounted cashflow projections for Swan Hills.

## 9.6 Woodlands County – An Inclusive Regional Network

As an example County within GROWTH Alberta, consider Woodlands County – the least dense, but with the largest population centre. Broadband has been on the Woodlands agenda for some time and the County is currently considering various ways in which it might play a role in helping fill the coverage gaps. Approaches include working with TELUS and local ISPs.

The approach taken here involved developing cost estimates to lay fibre to key ISP towers (towers that the ISPs would upgrade if their connected bandwidth could be increased) but routing the conduit/fibre in such a way as to pass through every town/village/hamlet so that when any of them are ready, they can easily connect. Draft routes appear in Figure 125. In the map, towns are marked with orange pins while hamlets are shown with yellow. ISP towers are represented by the green triangles. SuperNet access sites are shown with yellow text and circles. Proposed fibre routes to connect both the key ISP towers and provide a fibre access point in each hamlet are shown in yellow.

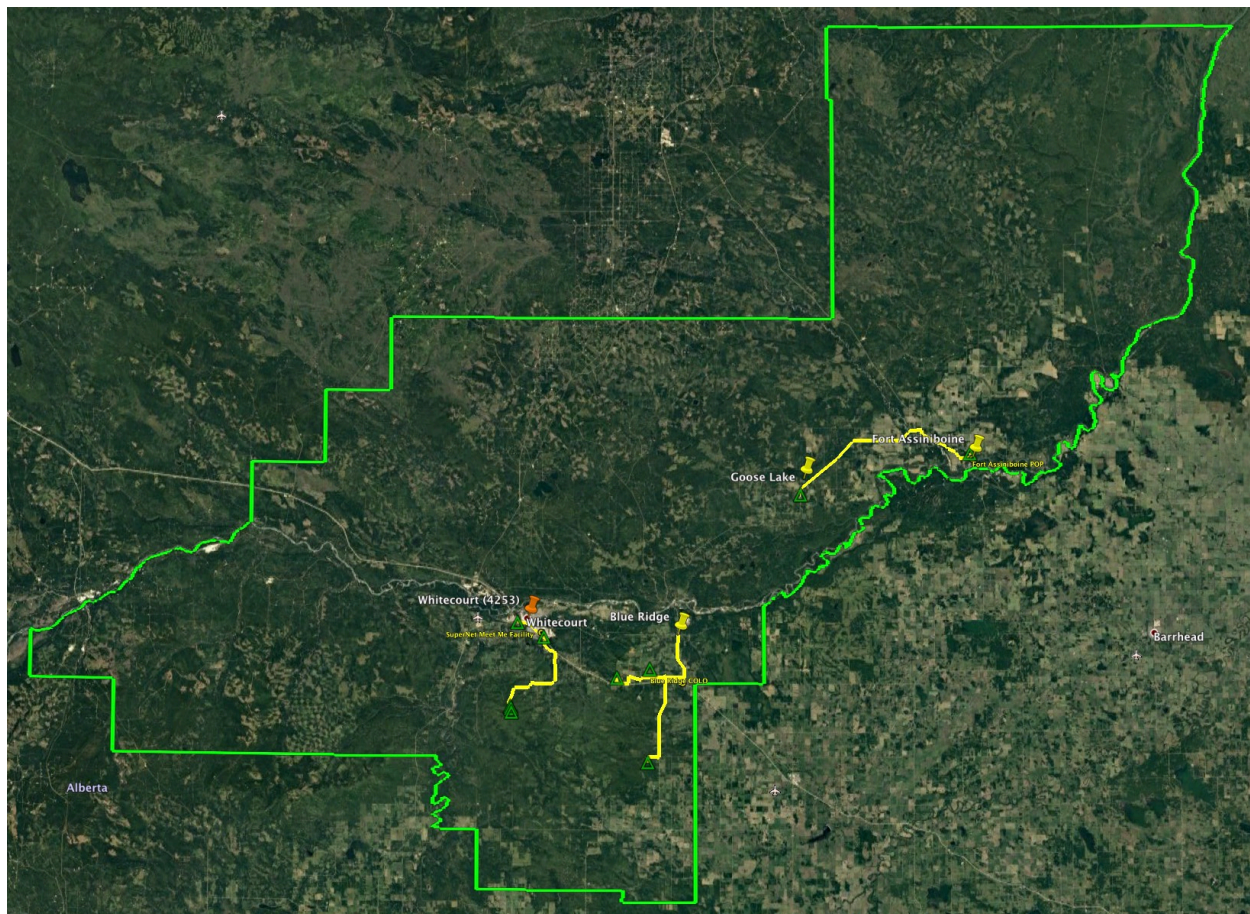


Figure 125 – Woodlands County.

Should the County elect to deploy the three fibre routes shown, they'd be looking at a capital cost of approximately \$3M. If just the higher priority southern two routes were deployed, the cost reduces to approximately \$2.0M. Either way, as the hamlets are small, a business case for deploying fibre to both the hamlets and the ISP towers is negative. Deployment then becomes a function of County priorities. Options include cost sharing with local ISPs, leveraging linear infrastructure projects, obtaining grant funding, and/or moving some of the cost to the tax roll. Should a utility network be established in Whitecourt, the operation could fund the build, but the required capital to initially float the operation would increase.

## 9.7 Extrapolating the Results

### 9.7.1 Municipal Networks

As representative financials have been provided for a range of community sizes, extrapolating the results to other communities with GROWTH Alberta is straightforward. As all others are much smaller than Whitecourt, partnering between communities will be needed to make fibre available to all.

As an example, say Whitecourt, Barrhead, and Swan Hills partnered and built out their own access networks over a period of three years. Assuming a utility-based, lit, open-access network, the summary financials for this scenario appear on the left side of Table 44 and the non-discounted cashflow chart appears in Figure 126. Overall, the combined financials are excellent.

Table 44 – Utility Model Results Summary for Whitecourt, Barrhead, and Swan Hills

Whitecourt, Barrhead, and Swan Hills		Regional Network with Whitecourt, Barrhead, and Swan Hills	
	Results		Results
Years to positive cashflow		Years to positive cashflow	
Operating	4	Operating	4
With debt servicing (p&i)	5	With debt servicing (p&i)	5
Financing		Financing	
Start-up capital required	22,160,346	Start-up capital required	25,731,364
Net Cashflow - before debt servicing		Net Cashflow - before debt servicing	
Profit - annual at 10 yr	1,434,593	Profit - annual at 10 yr	1,410,301
Profit - annual at 15 yr	1,948,939	Profit - annual at 15 yr	1,925,722
Net Cashflow - after debt servicing		Net Cashflow - after debt servicing	
Profit - annual at 10 yr	742,271	Profit - annual at 10 yr	711,464
Profit - annual at 15 yr	1,242,919	Profit - annual at 15 yr	1,212,112

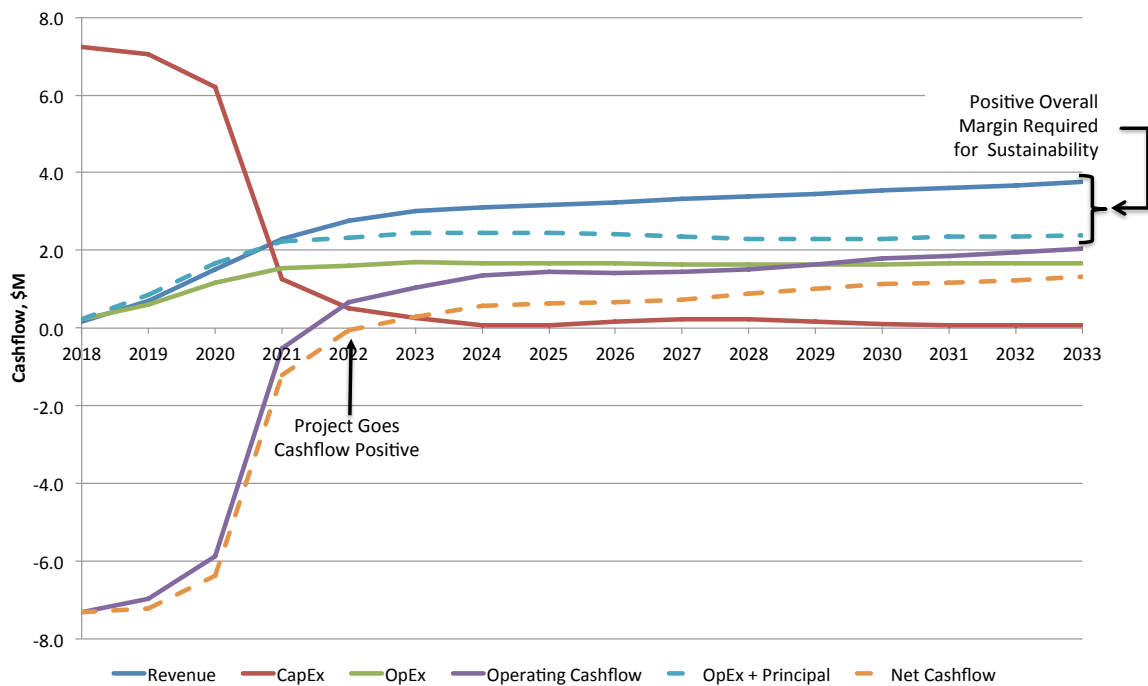


Figure 126 – Non-discounted cashflow projections for Whitecourt, Barrhead, and Swan Hills.

### 9.7.2 Regional Networks

As low densities and small communities are typical of the GROWTH Alberta region, the issues faced by Lac Ste Anne, Barrhead, and Westlock will be similar to those faced by Woodlands. Business cases for fibre deployment will be difficult and deployment will largely become a function of County priorities. Options include cost sharing with local ISPs, leveraging linear infrastructure projects, obtaining grant funding, and/or moving some of the cost to the tax roll. Another option is to increase the scale of the undertaking. If a regional network were deployed to cover Whitecourt, Barrhead, Swan Hills, and Woodlands County, the business case – as shown by the summary financials on the right side of Table 44, work.