

# Research and Discussion Paper

## Peace River – Fort McMurray Transportation and Utility Corridor

Prepared for:  
Northern Alberta Development Council

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**Table of Contents**

- 1. Executive Summary ..... 1
- 2. Project Background ..... 7
  - 2.1 Problem Definition ..... 7
    - 2.1.1 Road ..... 7
    - 2.1.2 Multi-Use Corridor ..... 7
    - 2.1.3 Implementation Priority and Timing ..... 7
  - 2.2 Opportunity ..... 8
    - 2.2.1 Linear Infrastructure Planning ..... 8
    - 2.2.3 Linear Infrastructure Compatibility ..... 9
  - 2.3 History and Background ..... 10
- 3. Project Description ..... 19
  - 3.1 Objectives ..... 19
  - 3.2 Scope ..... 19
  - 3.3 Out-of-Scope ..... 20
  - 3.4 Comparison of East Portion to West Portion of Corridor ..... 20
  - 3.5 Stakeholders ..... 21
    - 3.5.1 Municipalities ..... 21
    - 3.5.2 Organizations ..... 21
    - 3.5.3 Government of Alberta Ministries ..... 21
    - 3.5.4 Industry ..... 22
    - 3.5.5 Aboriginal Groups ..... 22
    - 3.5.6 Economic Development Groups ..... 23
    - 3.5.7 Residents of Northern Alberta ..... 23
    - 3.5.8 Temporary, Mobile Workers ..... 23
- 4. Stakeholder Input ..... 24
  - 4.1 Introduction ..... 24
  - 4.2 Strategic Alignment with Government of Alberta Ministries ..... 24
    - 4.2.1 Alberta Transportation ..... 24
    - 4.2.2 Alberta Aboriginal Relations ..... 25
    - 4.2.3 Alberta Agriculture and Rural Development ..... 25
    - 4.2.4 Alberta Energy ..... 26
    - 4.2.5 Alberta Environment and Sustainable Resource Development (ESRD) ..... 26
    - 4.2.6 Alberta Innovation and Advanced Education ..... 27

# Research and Discussion Paper, Peace River-Fort McMurray Transportation and Utility Corridor

4.2.7	Alberta Municipal Affairs.....	27
4.2.8	Alberta Tourism, Parks and Recreation (TPR).....	28
4.3	Input from Municipalities.....	29
4.4	Input from Organizations.....	30
4.5	Input from Industry.....	30
4.6	Input from Aboriginal Groups.....	31
5.	Cost/Benefit Analysis.....	32
5.1	Methodology.....	32
5.2	Scope.....	32
5.3	Cost Estimates.....	35
5.4	Cost Savings.....	35
5.5	Stakeholders Benefitting.....	39
5.5.1	Benefits of the Peace River to Fort McMurray TUC.....	39
5.5.2	Benefits of A Multi-Use Corridor vs. Single Use Corridors.....	40
5.5.3	Stakeholder Differences between East and West Portion of Corridor.....	40
5.6	External Impacts.....	41
5.7	Cost Benefit Model.....	42
5.8	Summary of Results.....	44
5.8.1	Economic Impact Summary.....	44
5.8.2	Project Impact on Socio-Economic Indicators.....	44
5.8.3	Summary of Quantifiable Benefits and Costs.....	45
6.	Funding Alternatives.....	46
6.1	Description of Funding Alternatives.....	46
6.2	Funding Input from Potential Funders.....	47
6.3	Potential New Participants.....	47
6.3.1	TUC Administrator.....	47
6.3.2	Partnerships.....	48
7.	Conclusions and Recommendations.....	49
7.1	Conclusions about Multi-Use Transportation and Utility Corridors in General.....	49
7.2	Conclusions about the Peace River to Fort McMurray Multi-Use TUC.....	50
7.3	Recommendations about TUCs in General.....	51
7.4	Recommendations about the Peace River to Fort McMurray TUC.....	51
	Bibliography.....	52
8.	Appendices.....	54
	Appendix A - Northern Canadian Integrated Road Network Plan, 1998.....	55
	Appendix B – Excerpt from Responsible Actions: A Plan for Alberta’s Oil Sands.....	56

Research and Discussion Paper, Peace River-Fort McMurray Transportation and Utility Corridor

Appendix C – Map of East/West Connector, Functional Planning Study, Stantec Consulting	57
Appendix D – CRISP for Athabasca Oil Sands Area .....	58
CRISP - Phase 2 Overview 2015-25 .....	58
CRISP - Phase 4 Overview, 2035-2045 .....	59
CRISP – Rationale for Multi-Use Corridors .....	60
CRISP – Additional Utility Corridor Requirements .....	61
Appendix E – Alberta Pipeline Systems from - Oil Market Access: Alberta’s Situation 2013..	62
Appendix F – G7G Rail Proposal Shown in Oil Market Access: Alberta’s Situation 2013.....	63
Appendix G – Detailed Costing .....	64
Appendix H – Previous Reports, 1995-2010.....	67

## 1. Executive Summary

### *Project Description*

The Northern Alberta Development Council (NADC) commissioned this report to do an analysis:

- Of the economic, social and environmental impacts on the concept-in-principle of building a transportation and utility corridor between Fort McMurray and Peace River.
- To confirm which potential linear infrastructure initiatives are compatible with other infrastructure in a corridor.
- Of a 444 km Transportation and Utility Corridor (TUC) between Peace River and Fort McMurray to promote sustainable development in Alberta's northern region.

Such a corridor could contain two or more of the following uses: road, rail, water line, power, telecommunications cable, and oil/gas pipeline. This project should be seen as two inter-linked projects:

- East Portion from Fort McMurray to Peerless Lake, with currently no connecting road
- West Portion from Peerless Lake to Peace River, currently connected by highway

Significant differences exist between these two portions as summarized in the table below:

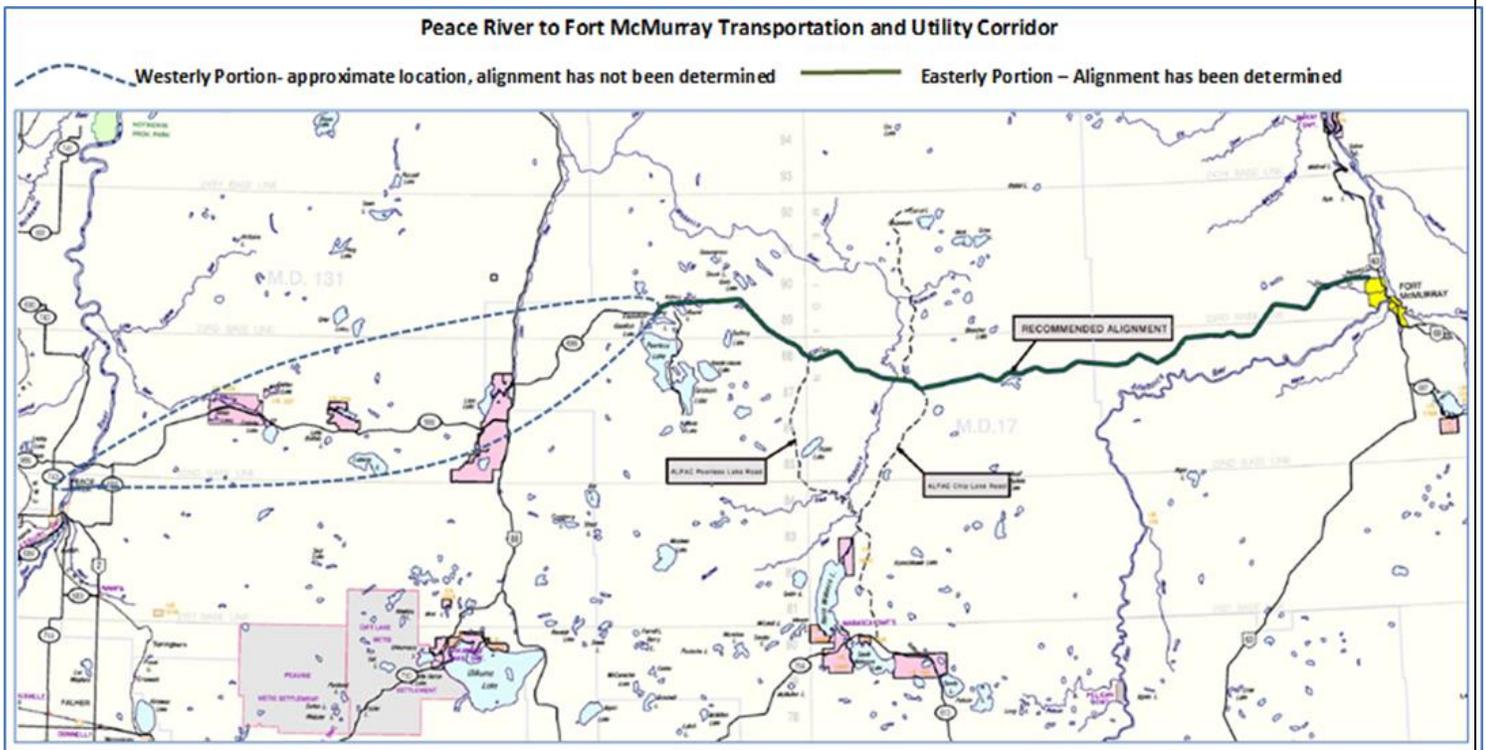
<b>Parameter</b>	<b>East Portion</b>	<b>West Portion</b>
Communities Connected	Fort McMurray to Peerless Lake	Peerless Lake to Peace River
Distance	218 kilometres	226 kilometres
Current Road Infrastructure	None	Highway 986
Current Utilities parallel to Road	NA	None
Method and Status of Corridor Route Selection	Selected via from Stantec study	Not selected, but would likely follow established Highway 986
Utility and Pipeline Needs Considered in Route Selection	Not in a comprehensive manner	No, road upgrades only
New Right-of-Way Requirements	Road and utilities	Utilities only, assuming route follows road
Aboriginal Consultation on Route	Extensively done by Stantec; route adjusted to avoid splitting approved Treaty settlement land claim	In concept only, not specific route, process was begun through this project/report (included east portion too)
Aboriginal Concerns	Impacts on traditional way of life, treaty rights, Economic opportunities	Requires in depth consultation
Related CRISP (Regional Plan)	Athabasca Oil Sands Area – issued in 2012	Peace River Oil Sands Area – under development
Project Status in CRISP	Included, implementation in 2015-2025 period	Road upgrades only, unscheduled

Stakeholder groups who provided input to this report were:

Municipalities	Resource & utility industry representatives
Aboriginal groups	Non-profit Sector
Government of Alberta – various Ministries	Economic development contacts

# Research and Discussion Paper, Peace River-Fort McMurray Transportation and Utility Corridor

The map below is sourced from Alberta Transportation's website ([www.transportation.ab.ca/projects/northeast.aspx](http://www.transportation.ab.ca/projects/northeast.aspx)). The dotted line has been added to show the approximate location of the TUC on the west portion of the corridor.



### Cost-Benefit Analysis

As part of this project’s sensitivity analysis, three TUC scenarios – Minimal, Partial and Full were analyzed for cost-benefit. The three scenarios can generally be described as:

TUC Scenario Definition			
	Minimal TUC	Partial TUC	Full TUC
East Road TUC	100%	100%	100%
West Road TUC	0%	0%	100%
Rail	0%	0%	100%
Oil and Gas	20%	35%	50%
Power	0%	100%	100%
Water	0%	25%	50%
Telecommunications	25%	50%	100%

\*Percentages indicate the length of linear infrastructure (as a % of the entire 444 km length) within the TUC.

Quantifiable costs and benefits for each scenario are presented in the table below.

Summary of Project Quantifiable Benefits and Costs <sup>1</sup>			
	Minimal TUC Scenario	Partial TUC Scenario	Full TUC Scenario
Total Scenario Benefits (millions)	\$670.95	\$1,781.40	\$4,860.39
Total Scenario Costs (millions)	\$356.69	\$1,054.33	\$2,909.48
Benefits minus Costs (millions)	\$314.26	\$727.07	\$1,950.91
Benefit to Cost ratio	1.88	1.69	1.67
Increase in years over Minimal TUC Scenario	-	5	10
NPV @ 10% discount (millions)	\$314.26	\$451.45	\$752.16

The faster the Partial and Full TUC scenarios proceed, the larger the net present value.

<sup>1</sup> Not all costs and benefits can be quantified.

This project would result in many sustainable social, environmental and economic benefits widely distributed and enjoyed by stakeholders but especially these groups:

### Benefits of The Peace River to Fort McMurray Corridor to Stakeholders

N.B. These are the benefits of the corridor itself, **not** Multi-use vs. Single use Corridors

Category	Specific Benefit	Area Residents	Albertans	Tourists from Out-of-Province	Temporary Workers	Federal Government	Government of Alberta	Local Municipalities	Resource Development Industries	Existing Small Businesses in Region	New Commercial & Industrial Businesses	Road Construction & Related Industry	Utilities - Gas, Power, Water, Telecom	Transportation/Trucking Industry
<b>Social</b>	Create jobs - Direct	X	X			X	X	X		X			X	
	Create jobs - Indirect, Construction	X	X		X	X	X	X		X	X	X	X	X
	Create jobs - Induced e.g. Forestry, Tourism	X	X			X	X	X	X	X	X			X
	2nd access to FM improves emergency safety	X	X	X	X	X	X	X	X	X	X		X	X
	Improved access to health care services	X		X	X		X		X	X	X			
	Improved access to education services	X			X		X		X	X	X			
	Lower cost of living	X			X			X	X	X	X			
	Increased income levels	X				X	X	X	X	X	X			X
	Popl. growth allows communities to provide a wider range of services and amenities	X		X	X	X	X	X	X	X	X			
<b>Environmental</b>	Reduced transport CO2 emissions	X	X	X	X	X	X	X	X	X				X
	Better access to manage wildfires	X		X	X	X	X	X	X		X		X	X
	Better access to large areas for eco-tourism	X	X	X		X	X	X		X	X		X	
	Reduction in project specific resource roads	X				X	X	X	X					X
<b>Economic</b>	Improved access to resources e.g. oil, gas				X	X	X		X					
	Reduced transportation costs	X			X			X	X	X	X			X
	Better access to export resources to markets		X			X	X		X		X		X	X
	More options to transport oversized modules					X	X		X		X			X
	Growth in Gross Domestic Product (GDP)					X	X							
	Increased land development abutting corridor										X			
	Increase in property tax revenue						X	X						
	Increase in corporate/business tax revenue	X	X			X	X	X						
	Increase in personal tax revenue		X			X	X							
	Increase in royalty revenue	X	X			X	X	X						
	Increase in revenue from oil and gas leases	X	X			X	X	X						
	Increase in revenue from forestry cutting permits	X	X			X	X	X						
Increase in GST revenue					X									

### ***Conclusions about Multi-Use Transportation and Utility Corridors in General***

1. The costs associated with developing a multi-use transportation and utility corridor across an area are lower than the status quo option of developing individual single use corridors across a larger area.
2. The social and environmental benefits associated with developing multi-use transportation and utility corridors are higher than the status quo option of developing single use corridors.
3. Therefore, there is a positive cost-benefit of developing multi-use transportation and utility corridors instead of the status quo option of single use corridors.
4. Recognizing the very positive cost-benefit of a multi-use transportation and utility corridor compared to single use corridors, there are two established and planned corridors in Alberta, around Edmonton and Calgary.

### ***Conclusions about the Peace River to Fort McMurray Multi-Use TUC***

1. Many key stakeholders view this as two separate initiatives (i.e. east and west portions) which in turn impact almost every aspect of the project, including costs, benefits, priority and timing.
2. Despite the significant benefits associated with a complete link created by a Peace River to Fort McMurray TUC, to date there is much more support and consensus for the east portion of the Corridor.
3. Utility uses and their additional right-of-way requirements were a minor consideration in route planning and selection to date in the report prepared by Stantec.
4. The route for the east portion that was proposed by Stantec may need to be adjusted to better accommodate the needs of additional partners such as oil pipeline and utility operators.
5. A road does not necessarily have to be the first linear infrastructure built within the multi-use corridor, as has been the situation in recent history.
6. A strong champion with the required authority is needed to drive the corridor project.
7. The implementation framework from the successful Edmonton and Calgary TUCs can be modified to apply to the Peace River to Fort McMurray TUC.
8. The cost-benefit analysis reveals that the Minimal TUC scenario has the highest benefit to cost ratio.
9. The TUC scenarios (Minimal, Partial, Full) are not mutually exclusive and therefore the faster any TUC scenario can be started, the better the overall result.

### *Recommendations about TUCs in General*

All recommendations are directed towards the Government of Alberta.

1. Develop a comprehensive and integrated strategy to transport resources and commodities by road, rail and pipeline.
2. During project planning and route selection, consider the requirements of all potential users for TUCs, not just roads or the first infrastructure/utility to be built.
3. Undertake benchmark research on multi-use TUCs outside urban areas to learn lessons from others. Undertake this research with a global scope and no geographic limit.
4. Engage Alberta Infrastructure to examine the governance and administrative framework in place for the Calgary and Edmonton TUCs, to determine if and how this framework or a modified version could be applied for TUCs outside urban areas.
5. Ensure that coordinating mechanisms or processes are in place to consider land use and infrastructure issues that are common across planning areas such as the Comprehensive Regional Infrastructure Sustainability Plans (CRISP) for the Peace River and Athabasca Oil Sands Areas.
6. Consider improving the sharing and updating of public information on significant government and private sector projects in Alberta, starting at the early planning stages.
7. In recognition that developing effective multi-use transportation, utility and energy corridors will require significant changes to our norms, sponsor a research paper on barriers to implementation including identification, root causes, classification and removal or minimizing these barriers.

### *Recommendations about the Peace River to Fort McMurray TUC*

8. Appoint a cross ministry team including Aboriginal Relations, Environment and Sustainable Resources, Energy, Transportation, with the Oilsands Sustainable Development Secretariat or Alberta Infrastructure as the interim champion for this project, to guide the next steps.
9. Review the route for the east portion of the corridor based on a comprehensive analysis of all the requirements of all potential users for TUCs, not just the road.
10. Review and adjust the right-of-way requirement for the east portion of the corridor based on all user requirements, including setbacks.
11. Recognize the west portion of the corridor as a legitimate project and plan for route evaluation and selection as a key first step.
12. Undertake detailed discussions with potential funding partners to identify who could contribute what to the various components of this project.

## **2. Project Background**

### **2.1 Problem Definition**

This project is aimed at addressing a range of inter-related problems in the vast northern part of Alberta between Peace River and Fort McMurray that can be categorized into three themes.

#### **2.1.1 Road**

- No direct road or highways exists connecting the two regions; the farthest east one can travel by road from Peace River is Peerless Lake, more than 200 kilometres from Fort McMurray. Therefore there are no East-West options for the transport of machinery, equipment goods, people and resources in and out of the thriving Fort McMurray area.
- In the east portion, from Peerless Lake to Fort McMurray, there is no provincial road or highway, making it difficult, time consuming and expensive for industry to access resources including oil, gas, minerals and forests.
- In the east portion, due to the lack of road infrastructure, residents (mostly Aboriginals) are isolated from accessing services, although a road may have undesirable social impacts.

#### **2.1.2 Multi-Use Corridor**

- Despite dozens of government plans, studies, policies and goals touting the need for multi-use corridors for roads and utilities to better serve northern Alberta, none have yet been developed.
- Because a TUC is an unconventional approach to planning and delivering linear infrastructure in remote areas, there are many barriers that exist that inhibit this change from being implemented.
- Even for the east portion of the corridor which has been planned by the government but not yet scheduled, the only confirmed use of the corridor is a road. Without others users, e.g. oil pipelines, then it is multi-use in name only.

#### **2.1.3 Implementation Priority and Timing**

- This project, in one form or another has been discussed and analyzed for about 18 years by different stakeholders from a wide range of perspectives.
- The planning status of various components and portions of the corridor are at different stages.
- Information on the status of various components of the corridor is not shared universally amongst stakeholders.
- Expectations by some stakeholders are unrealistic regarding the planning and implementation lead times for such a large and complex infrastructure project.
- For the west portion of the corridor, The Government of Alberta currently only recognizes that the roads need upgrading.
- For the west portion, there is no plan for a multi-use corridor.

## 2.2 Opportunity

### 2.2.1 Linear Infrastructure Planning

Historically, the planning of linear infrastructure in Canada reflects four overlapping phases, that parallel the evolution of technology:

1. Rail Era  
In the 1800's and early in the past century, rail lines were the first major linear infrastructure planned and built.
2. Road follows Rail  
Subsequently, as electricity and the automobile evolved, roads and power lines were added along the rail right-of-way, as well as on a more localized basis.
3. Road Dominates  
For about the past 100 years, as the automobile has increasingly come to dominate almost every aspect of our lives, roads have been the dominant, driving force to expand linear infrastructure. Then the utilities followed (power, water, sewer, or telecom), using the same route or right-of-way due to convenience, not long term planning.
4. Energy Corridors  
To date, in Alberta, multi-use corridors have only been adopted for the Calgary and Edmonton peripheries. These corridors were designed primarily to meet transportation needs.

In the CRISP and Land Use Framework (LUF) documents under development or recently published, there are plans to adopt multi-use corridors in remote areas. One of the main uses for such corridors is for energy (oil and gas pipelines), not as utilities but as large facilities to move Alberta resources to export markets.

This project, a multi-use transportation and utility corridor in an undeveloped area, presents an opportunity to plan linear infrastructure in a new way, to question conventional thinking, to plan for the long-term in a holistic way. To this end, questions that should be asked include:

- What corridor uses/users should be considered in route selection?
- Whose needs should be weighted higher and why?
- Which use should be developed first in sequence, why?
- Should the first piece of infrastructure (e.g. road) automatically get weighed higher when considering route selection? And if so, why?
- Can oil and gas pipelines co-exist with roads and other linear infrastructure?

### 2.2.3 Linear Infrastructure Compatibility

A legitimate concern of any corridor user is whether their infrastructure can technically co-exist with the other users, with minimal risk of failure or potential harm to humans and property. As the matrix below illustrates, there is only one compatibility issue amongst the six types of linear infrastructure.

	Road	Rail	Fiber Optic Cable	Power Line	Plastic Water line	Metal Gas/Oil Pipeline
Road						
Rail						
Fiber Optic Cable						
Power Line						
Plastic Water line						
Metal Gas/Oil Pipeline						

Details on the compatibility issue and mitigation measures follow, as sourced from BC Hydro<sup>2</sup>:

- *“To avoid the risk of a fault transfer, if electricity arcs from the overhead power line to the ground or, to BC Hydro’s underground facilities, proper positioning of proposed underground utilities (e.g. sewer, water, irrigation, conduit) is required to prevent an accident.*
- *No proposed underground works can be located between a Hydro guy anchor and pole/tower structure.*
- *All proposed underground works must be designed to be a minimum 10 metres (32.8 feet) from BC Hydro’s works, both overhead and underground, with the exception that metal/ductile iron (DI) pipe or gas installations require a 30 metre separation.*
- *If BC Hydro is to reduce (or enlarge) the separation for any project it will be by specific review and may require an induction and/or soil resistivity study.*

#### Pipelines

- *BC Hydro must receive a detailed proposal (to be reviewed and accepted) for any pipeline works proposed within 30m of BC Hydro works or ROW.*
- *Installation and operation of the pipeline must be in accordance with CAN/CSA-22.3 No. 6-M91—Principles and Practices of Electrical Coordination between Pipelines and Electrical Supply Lines.*
- *Pipelines must not negatively impact BC Hydro’s ability to access, maintain and operate its ROW and works. Permanent crossings within/across access roads and tracks may need to be provided.*
- *It is best if non-metallic piping can be used for the installation within the ROW. A ground fault between a metal/ductile iron (DI) pipe and any BC Hydro works could present unsafe levels of fault transfer to the DI pipe.*
- *In order to locate a buried pipeline sometimes Regulations call for a tracer wire to be installed (e.g. Gas/Oil pipelines). From an electrical perspective a tracer wire is no different than a metallic pipeline in the ground.*
- *A viable alternative to a tracer wire...when in proximity to a power line, is an Electronic ID Marker.*
- *There are recommended clearances (distance depends on power line voltage) needed to BC Hydro’s works for maintenance and to prevent arcing to the pipeline (or tracer wire) due to a power line fault.*

<sup>2</sup> <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/safety/bc-hydro-rights-of-way-guidelines-compatible-uses-development-near-power-lines.pdf>

- *BC Hydro has found that for a 30kA median lightning current and an average soil resistivity in B.C. of 1000 ohm-m, the minimum separation distance to prevent arcing is 30 metres.*

Therefore for this TUC, it is recommended that power transmission lines are located at least 30 metres from any metal gas or oil pipeline. One way to ensure this separation is maintained is to locate two such uses on opposite sides of the road. There may be other potential methods, such as using cathodic protection to protect the pipeline and reduce the separation.

### 2.3 History and Background

This section summarizes the relevant portions of previous reports since 2010 that are related to this project, presented in chronological order. Readers should be careful in interpreting this information and its relevancy.

Summaries of earlier/older reports that have some relevance are provided in Appendix I.

#### **2011 East/West Connector Highway 686 to West of Fort McMurray Functional Planning Study – Final Report**

The Stantec Consulting Ltd. study is the most relevant of all previous analysis for **the east portion** of the corridor, from Peerless Lake to Fort McMurray.

##### **Objectives**

Starting in 2008 and concluding in 2011, Stantec Consulting, under contract to Alberta Transportation prepared a Functional Planning Study, with the following objectives:

- Identify, review and evaluate alignments within the south corridor from the 2004 study
- Develop plans of the recommended alignment
- Identify right-of-way requirements; and
- Address access management requirements

##### **Process**

- This was the detailed alignment study following the earlier corridor study in 2004 that looked at a north and south route
- This study spanned almost three years and was very thorough
- First Nation consultation was properly undertaken and recorded:
  - Consultation began in May 2008 with notification letters
  - Included public information sessions and consultation
  - Route selection was influenced by this consultation, specifically the Treaty Land Entitlement (TLE) for Big Stone Cree/Peerless Lake/Trout Lake negotiated during the study. **The route was modified so as not to bisect the TLE**
  - Record of Consultation (ROC) for this study was signed off August 3, 2010

## Results

- Almost all of lands are undeveloped, crown-owned, forested, leased for resource based industry and used by Aboriginal groups for traditional uses
- A preferred 218 km long route in a 300 meters wide corridor connecting Highway 63 near Fort McMurray to Highway 686 north of Peerless Lake has been selected:
  - See Appendix C for the route alignment map
  - Utilities are planned in the corridor, even though they appear as an afterthought:
    - *“Due to recent provincial initiatives a utility corridor has also been protected, parallel and north of the highway alignment with a width of 124 metres. In total a width of 300 metres is being protected for the project” (P e6)*
  - Provided a conceptual capital cost estimate to construct a 2-lane gravel highway of \$385 Million in 2010 dollars, which excludes environmental mitigation costs

## Impacts

The Stantec study identified several economic, social and environmental impacts (as well as mitigation measures) from the east portion of the corridor project, including but not limited to:

### Environmental:

- Soils and vegetation, including rare plants
- Fisheries, including 25 fish species in Watercourse crossings
- Wildlife including a Woodland Caribou range and 7 other species
- 9 Archaeological sites
- 1 Historical Site

### Economic:

- 17 oil sand leases in place
- 12 major pipelines and power lines
  - 30 identified pipeline crossings
  - 23 identified ATCO Power transmission Line Crossings
- 42 fur management agreements
- 5 Forest Management Zones, most of which are ALPAC Forest Products zones

### Social:

- 12 Aboriginal groups and communities
- Two municipalities

## Future Steps

Stantec outlined future work requirements, including legislative reviews for this project under the following headings:

- Environmental Clearances for Tree Clearing Program
- Alberta Sustainable Resources Development
- Alberta Environment
- Federal Fisheries Act
- Navigable Water Protection Act

- Migratory Bird Convention Act
- Species at Risk Act

### **Long-Range Plan**

To start, the roadway would be a 10-metre wide gravel 2-lane undivided highway with sufficient width and make-up for conversion to a 2-lane highway. However:

- *“It’s been planned to accommodate twinning in the future, albeit a long term option. Sufficient right-of-way has been assumed for a centreline separation of 54 metres due to the rural nature of the highway and the land traverses through crown land. In total the right-of way protected for the entire roadway is 176 metres, which will allow for the construction of parallel service roads, if required. The proposed right-of-way and centreline separation will ultimately allow flexibility for the roadway to be upgraded to an 8-lane roadway.” (PP E5-6)*

## **2011 Comprehensive Regional Infrastructure and Sustainability Plan (CRISP), Lower Athabasca Oil Sands Area**

The CRISP report provides an eloquent statement of the rationale for multi-use corridors in this region:

- *“As oil sands production in the AOSA increases, so too will the demand for new utility corridors to distribute materials such as bitumen, diluents, natural gas, electricity, and carbon for carbon capture. The CRISP considers opportunities for consolidating these facilities within multi-use corridors that can minimize land fragmentation and environmental impact.” (P. 27)*

Two guiding principles in the plan that seem most relevant to this TUC project are:

- *“Provide strategic redundancies in critical infrastructure, such as multiple transportation routes to major centres, that can be used in the event of emergencies” (P. 32)*
- *“Identify and protect corridors for long-term linear infrastructure needs.” (P. 33)*

This plan makes direct reference to previous work (by Stantec on behalf of Alberta transportation) on the East-West Connector, however, recommends a 2-lane service level unlike the eventual 8-lane plan proposed by Stantec:

- *“Alberta Transportation has planned a new east-west corridor connecting Fort McMurray with the western part of the AOSA. An extension of the Highway 813 corridor north to the Chipewyan Lake Area is also planned by Alberta Transportation. This link would serve as the primary commuter route between Wabasca and Bigstone Cree First Nation and the project sites to the north. The traffic modeling undertaken for the CRISP suggests that a two-lane level of service will be sufficient for these corridors.” (P. 36)*

In Phase 2 of the CRISP, (2015-2025) which is summarized in Appendix D:

- *“Four major new transportation corridors are added in this phase. A new north-south corridor east of the Athabasca River connects both Fort McMurray and the new urban growth node to project sites east of the river. The ring road around Fort McMurray is completed with the addition of the link around the west side of the city. A new east-west corridor is established to connect Fort McMurray with communities to the west. Finally, Highway 813 is extended northwards to connect Wabasca and Bigstone Cree First Nation to the growing employment opportunities associated with oil sands projects in the west.” (P. 50)*

In Phase 4 of the CRISP, (2035-2045), also summarized in Appendix D:

- *“Population growth continues to be strong in the urban growth node and in Wabasca. Growth in both of these communities is related to employment growth in the Chipewyan Lake area. A new transportation corridor connecting both Wabasca and the new urban growth node to these employment areas allows these communities to house the workforce for some of this project activity. Earlier investment in increased Aboriginal workforce participation initiatives will be particularly relevant in this phase as it is expected that growing Aboriginal communities at Bigstone Cree First Nation, the Slave Lake Area, Red Earth Creek Area and Fort Vermillion area would provide a significant proportion of the workforce in the western subregion of the AOSA, either through direct commuting, or as residents of the growing planned work camp community.” (P. 54)*

## **2012 Contribution of the NADC Region to the Alberta and Canadian Economies**

This report, prepared by Nichols Applied Management, provides an overview of the NADC region’s population, economy, and overall economic health, including:

- *“The total GDP produced within the NADC region was approximately \$41 billion in 2011, roughly 17% of Alberta’s total \$241 billion GDP.” (P.13)*
- *“While the NADC regional economy displays some characteristics of a healthy economy, namely the full employment of resources and positive growth, it lacks a diversified industrial base which in turn contributes to a high degree of volatility in that growth.” (P.20)*

### **Future Opportunities**

The following opportunities exist for the Alberta and NADC regional economy to grow and increase the percentage of the economic benefits captured locally.

- Increasing the upgrading and refining capacity within Alberta will allow for more value-added in the province and possibly the NADC region which will create additional jobs and revenues to government;
- Training, educating, and offering other needed supports to the under-engaged and under-employed Aboriginal workforce throughout the region;
- Encouraging the expansion of the support industries related to oil sands construction and operations such as the ability to fabricate key components;
- Diversifying the output of the forestry industry to include new products such as wood-based biofuels and engineered structural products.

## **2012 Alberta Transportation: Alberta’s Situation**

This presentation was delivered at the Northwest Economic Development Roundtable in October 2012. The presentation highlighted Alberta Transportation’s role in supporting economic development in the province. The presentation reviewed the current mandate, strategy and budget of Alberta Transportation. The presentation also highlighted some current and proposed projects for the northern region of the province. Statements about what the government is doing included:

- *“Ministry is developing long term transportation strategy.” (P.6)*
- *“Highway 88 Bicentennial Highway (Ft. Vermilion to Red Earth Creek) – Provide an alternate route to Northwestern Alberta, High Level and the Northwest Territories.” (P.11)*

Under future projects, including the route map from the Stantec study, but with no timeframe indicated was:

- *“Highway 686 East to Ft. McMurray (East-West Northern Corridor) – Open the north to development and provide access to natural resources.” (P.24)*

## **2012 Lower Athabasca Regional Plan, 2012-2022**

Excerpts from this planning report of direct relevance to this corridor project are provided below.

### **Definition**

*“A multi-use corridor is a dedicated land area identified by the Government of Alberta for co-location of linear infrastructure that supports critical economic linkages to markets. These corridors may include:*

- *Public highways*
- *Power transmission*
- *High speed rail and rail*
- *Pipelines (i.e. oil, gas, bitumen, carbon dioxide)*
- *Water management*
- *Telecommunications towers and underground fibre-optic cables; and*
- *Recreation trails” (P. 59)*

### **Related Objectives and Strategies**

- *“Coordinated industry planning of major access corridors and associated development infrastructure on public land (i.e. work camps, remote airstrips).” (P. 28)*
- *“Prevent future shortfalls in timber supply through using an integrated land management approach, including ...practices such as planning major access corridors (shared roads) and infrastructure (camps, remote air strips)...” (PP 38-39)*
- *“The region’s infrastructure and land base available for development are planned to facilitate population and economic growth and efficient use.” (P. 58)*
- *“Ensure that opportunities for future routes and siting for pipeline gateways, transportation corridors and utility and electrical transmission corridors are maintained in the region and in consideration of the needs of adjacent regions and jurisdictions.” (P. 58)*
- *“Identify critical economic linkages to markets including the Mackenzie Delta to connect with the Asia-Pacific market.” (P. 58)*

### **Corridor Justification**

- *“Maintaining future opportunities for development of provincial and cross-border infrastructure will help make the region’s economy innovative and competitive. Infrastructure, including pipeline corridors to connect the oil sands with new markets nationally and internationally, transportation and utility corridors and electricity transmission systems will ensure long-term optimization of the region’s oil sands and sustain a diversity of existing and future economic activities in the Lower Athabasca Region and Alberta. A multi-use corridor system would be competitive advantage and position Alberta as a trade gateway to grow new markets for Alberta goods and services. “(P. 59)*

### **2013 Oil Market Access: Alberta's Situation**

This presentation was delivered at the Northwest Economic Development Roundtable in September 2013. The presentation examined market access options for Alberta's natural resources. The presentation reviewed the current global oil markets and Alberta's challenge to export its oil using pipeline and rail options. Current and planned pipelines are shown in Appendix E. Statements about the rationale for government action included:

- *“Commercial Licence – must be economically viable;*
- *Policy/Regulatory Licence – must make sense to government;*
- *Social licence – must make sense to communities when environmental, community and First Nations interests are involved.” (P.53)*
- *“Strategic Infrastructure – investing in infrastructure where it makes sense.” (P.54)*

Amongst the strategies floated to improve the situation were:

- *“Infrastructure – Canada needs new energy infrastructure to the West Coast and the East Coast to diversify; consider a “public energy transportation corridor” to West/Asia.” (P. 14)*

One of the maps used in this presentation, shown in Appendix F, shows a “proposed G7G rail line”, starting from Fort McMurray, traveling north-west, to connect to the port of Valdez on the Gulf of Alaska.

### **2013 Forging Partnerships Building Relationships – Aboriginal Canadian and Energy Development, Report to the Prime Minister**

The author of this report, Douglas Eyford, is Canada's special federal representative on west coast energy infrastructure, appointed last year to identify approaches that could meet Canada's goals of expanding energy markets and increasing Aboriginal participation in the economy. His key observations, as summed up in his cover letter to Prime Minister Harper were:

- *“Canada and Aboriginal communities need to build effective relationships and this is best achieved through sustained engagement;*
- *Aboriginal communities view natural resource development as linked to a broader reconciliation agenda;*
- *Aboriginal communities will consider supporting natural resource development if it is undertaken in an environmentally sustainable manner*
- *These projects would contribute to improving the socio-economic conditions of Aboriginal communities.”*

### **2014 Transportation Utilities Corridor**

Alberta has valuable hands-on experience with transportation and utility corridors (TUC), having created one each in the restricted development areas (RDA) surrounding Calgary and Edmonton in the 1970's. While different in scope and objectives from the subject corridor, the Calgary and Edmonton TUCs provide an excellent base from which we can learn and adapt, especially in terms of definitions, enabling legislation and administrative framework. The following excerpts are derived from Alberta Infrastructure's TUC website, as posted on March 7, 2014, <http://www.infrastructure.alberta.ca/977.htm>.

#### **Objective**

- *To facilitate Infrastructure's development of the two cities, their surrounding regions and the Province by accommodating the provincial Ring Road system, major power lines, pipelines, regional water and sewer lines and telecommunication lines.*

### **TUC Administrator**

- *As the TUC administrator, Alberta Infrastructure (INFRA) has the mandate to regulate the use of all lands within the TUCs, purchase the TUC lands, sell TUC lands that become surplus to the program needs, manage the lands (approximately 500 leases are administered) and issue authorizations to any individual, organization or company before they undertake a surface disturbance, or any government authority exercising its authority in the TUCs.*

### **Legislative Mandate**

- *The legislative mandates for the TUC program are the Calgary, Edmonton and Sherwood Park West Restricted Development Area (RDA) Regulations. These regulations are administered by Alberta Infrastructure (INFRA) and require any person, company, municipality or other agency who proposes to enter and undertake an activity or use within the TUC lands to obtain prior authorization from INFRA.*

### **Uses within the TUC**

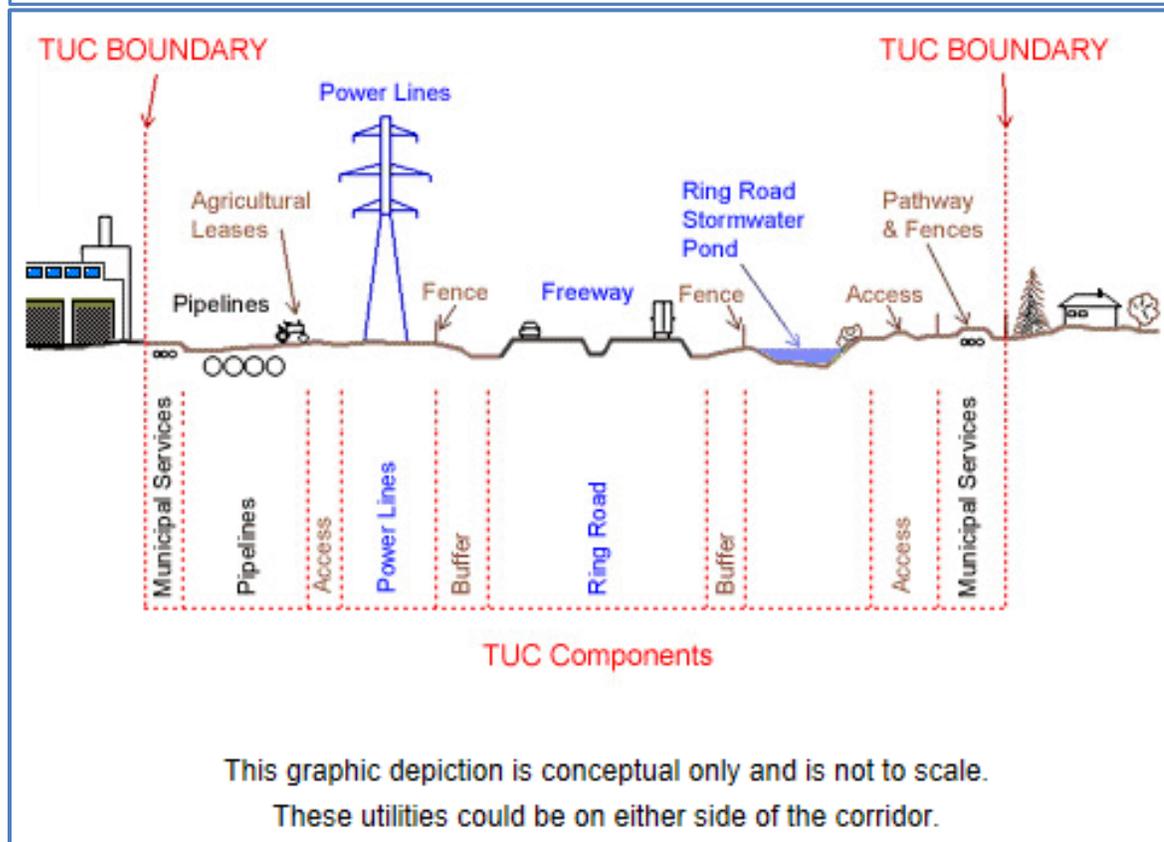
- *A TUC use may occur on, above or below the corridor land surface. Above-ground utilities (power lines) and underground utilities (pipelines) both have designated alignments that provide for access maintenance, landscaping, etc. Due to this multi-level aspect of uses, there may be two or more uses at a specific location within the corridor. There are three categories of uses recognized within the TUC: Primary, Secondary and Original.*
- *Primary Uses are linear transportation and utility facilities that the TUCs are planned to accommodate. These uses include Ring Roads and associated interchanges and storm water management facilities, petroleum pipelines, power transmission lines, telecommunications lines, and municipal regional water, sanitary and storm sewer lines. A TUC primary use, such as a roadway, may be planned but not yet built.*
- *Secondary Uses usually occur next to roadways, above underground pipelines, or below power lines. These uses include agriculture, utilities, parking, outdoor storage, recreation and commercial activities. Secondary Uses include subdivision-related contouring that encroaches onto a TUC, noise attenuation barriers, pathways and supplemental landscaping plants. These Secondary Uses are temporary, and care has been taken to ensure that these uses can easily be altered, or displaced, to accommodate Primary Uses.*
- *Original Uses*  
*While most of the TUC lands have been designated for various Primary Uses, the actual land use within portions of the corridors remains unchanged since the beginning of the program. The TUCs will take many more years to become fully developed. These Original Uses include agricultural, residential (mainly original farmsteads), sand and gravel mining, etc. Presently, much of the TUC land in which Original Uses have been retained are owned by INFRAS and leased out. Leasing assists with the maintenance of this land and generates revenue. As Primary and Secondary Uses are gradually developed, these Original Uses will be modified or displaced.*

### Typical Cross Section of a TUC

There are four major types of utility components within the TUCs:

- Ring Road (freeway) and buffer to allow for future widening and/or realignment
- Pipelines
- Powerlines - 69kV and above
- Municipal services (powerlines less than 69kV, stormwater management facilities associated with the Ring Road and regional water, sanitary or storm trunk sewers)

In addition, an access component is designed to maintain access for compatible secondary uses, for maintenance of the existing utilities, and for the installation of primary use facilities.



The following are key implementation tools and powers that INFRAS has at its disposal, through the legislation:

- For Crown lands, (which represent almost all of the TUC's) INFRAS may allow the use of the land by granting a Lease, Licence, Utility Right-of-Way or Right-of-Entry.
- For **all** TUC lands, both crown owned and other, INFRAS may issue Ministerial Consents to authorize Surface Disturbance or other actions by government agencies

**2014 Report due in March on Canadian-Alaska oil railroad link**

Since this report could be very important, but is not yet public, the most pertinent excerpts from a recent Alaska Journal of Commerce (Feb. 6, 2014) newspaper article are included below.

*“A preliminary feasibility study for a proposed 1,600-mile rail link from British Columbia to Alaska will be completed in March, officials with G7G Railway Corp., a Vancouver, B.C.-based company, told state legislators in Juneau Jan. 30. G7G hopes to ship Alberta oil by rail from Fort McMurray, Alberta, to Delta for export through the Trans-Alaska Pipeline System and the Valdez Marine Terminal, Alberta’s provincial government is interested in the idea and is funding the \$1.8 million pre-feasibility study through the Van Horne Institute at the University of Calgary, AECOM Canada Ltd. has been contracted to do the pre-feasibility study, he said. A key part of the G7G proposal is to include First Nation groups in Alberta, B.C., and Yukon Territory, as well as Alaska Native corporations, as partners. Vickers, who is himself Tsimshian with family connections to Haida in Southeast Alaska, said Canadian First Nations are opposing a plan by Enbridge and Kinder Morgan to build pipelines to B.C. and export crude oil by tanker.*

*Vickers said his company worked with scoping studies for an Alaska-Canada rail link that were sponsored by the state of Alaska and Yukon Territory that were done in 2006 and 2007. At that time the focus was on a railroad for exporting mineral ores from Alaska and Yukon and transporting general freight north.*

*Even if one of the pipelines to B.C. is approved and the Keystone XL pipeline goes ahead, G7G believes the growth of Canadian oil production will require more capacity in 10 to 15 years, and the big advantage of rail is that it can serve multiple customers. An initial estimate is that a single-track line to Alaska could be built for about \$12 billion and that a double-track line might cost \$16 billion,*

*If the pre-feasibility study shows the project to be possible, the next step is to raise several hundred million dollars to do a full-blown feasibility and engineering study.*

*Vickers said G7G’s conceptual studies show the cost of building and shipping crude by rail from Alberta to be about the same as by pipeline, and rail has the added advantage of being able to ship other bulk commodities from Alaska, particularly mineral ore. Passenger service could also be offered.”*

### **3. Project Description**

#### **3.1 Objectives**

These objectives are linked back to the problem description, outlined earlier in Section 2 and are grouped as follows:

##### **3.1.1 Road**

- Research and document the benefits for the road connector from Peace River to Fort McMurray.

##### **3.1.2 Multi-Use Corridor**

- Advance the concept of Multi-use corridors in general to better serve remote areas.
- Identify the key benefits of this corridor project proceeding
- Identify the key benefits of multi-use corridors vs. conventional single use corridors
- Identify key barriers that need to be removed or minimized so that the change from single-use to multi-use corridor planning and development can be realized.
- Identify potential partners to fund parts of the corridor or infrastructure within, to join Alberta Transportation, with its road interest

##### **3.1.3 Priority and Timing for Implementation**

- Improve stakeholders' understanding of:
  - The status of various components and portions of the corridor
  - Long lead times and phases entailed for such a large, complex undertaking.
  - The important role that the new Comprehensive Regional Infrastructure and Sustainability Plans and the Regional Plans play in the planning of new infrastructure and corridors.
- Identify the benefits of adding a multi-use component to the west portion of the corridor, to complement the road upgrades planned by The Government of Alberta.

#### **3.2 Scope**

This corridor could potentially include road, rail, oil and gas pipeline, power transmission lines and telecommunications systems.

The analysis is based on a specific route for the east portion, from Peerless Lake to Fort McMurray, and a non-specific route for the west portion, from Peerless Lake to Peace River.

The report includes input from key stakeholder groups:

- Alberta Ministries
- Municipalities
- Aboriginal groups
- Economic development and business organizations
- Industry – oil, pipeline, forestry, transportation utilities, etc.

The report uses a triple bottom line approach to address social, economic and environmental costs and benefits.

### 3.3 Out-of-Scope

During the course of this study, two other potential users of a multi-use corridor were identified, which were not in the original scope of work and therefore not investigated:

- Carbon capture pipelines
- Recreation trails, for use such as biking, horse riding, hiking, skiing and snowmobiling.

### 3.4 Comparison of East Portion to West Portion of Corridor

The table below compares key parameters for the east and west portions of the corridor.

Parameter	East Portion	West Portion
Communities Connected	Fort McMurray to Peerless Lake	Peerless Lake to Peace River
Distance	218 kilometres	226 kilometres
Current Road Infrastructure	None	Highway 986
Current Utilities parallel to road	NA	None
Method and Status of Corridor Route Selection	Proposed via Alberta Transportation and from Stantec study	Not selected, but would likely follow established Highway 986
Utility and pipeline needs considered in route selection	Not in a comprehensive manner	No, road upgrades only
New Right-of-Way Requirements	Road and utilities	Utilities only, assuming route follows Highway
Related CRISP (Regional Plan)	Athabasca Oil Sands Area – issued in 2012	Peace River Oil Sands Area – under development
Project Status in CRISP	Included, implementation in 2015-2025 period	Road upgrades only, unscheduled

### 3.5 Stakeholders

#### 3.5.1 Municipalities

The following 13 municipalities were selected based on the following:

- The corridor would likely run through or border these municipal districts and counties
- Towns and cities within the above counties and districts with a population of 5,000 or more

Status	Municipality	2013 Popl.
City	Grande Prairie	55,032
Specialized Municipality	Regional Municipality of Wood Buffalo	116,407
Municipal District	Birch Hills County	1,582
Municipal District	Clear Hills County	2,829
Municipal District	M.D. of Fairview No. 136	1,673
Municipal District	County of Northern Lights	3,555
Municipal District	Northern Sunrise County	2,525
Municipal District	M.D. of Opportunity No. 17	3,061
Municipal District	M.D. of Peace No. 135	1,446
Municipal District	Saddle Hills County	2,288
Municipal District	M.D. of Smoky River No. 130	2,126
Municipal District	M.D. of Spirit River No. 133	713
Town	Peace River	6,729

#### 3.5.2 Organizations

There is a wide range of organizations that could be impacted by the project, but only four were contacted to request input based on their direct interests:

- Athabasca Oil Sands Area Transportation Coordinating Committee (AOSATCC)
- Northwest Corridor Development Corporation (NCDC)
- Oil Sands Community Alliance (ASCA)
- Alberta Motor Transport Association (AMTA)

#### 3.5.3 Government of Alberta Ministries

Although this project could potentially impact every government ministry, the following eight provincial ministries would likely be impacted the most:

- Alberta Aboriginal Relations
- Alberta Agriculture and Rural Development
- Alberta Energy
- Alberta Environment and Sustainable Resource Development
- Alberta Innovation and Advanced Education
- Alberta Municipal Affairs
- Alberta Tourism, Parks and Recreation
- Alberta Transportation

### 3.5.4 Industry

One of the objectives of this report was to determine potential partners who would be interested in participating in the project as a funder of one or more components. The following companies were contacted for input.

Sector	Company
Power	Alberta Power System Operator
Power	AltaLink
Power	ATCO Power
Forestry	Al-Pac
Forestry	Millar Western
Forestry	Daishowa-Marubeni International (DMI)
Telecommunications	Bell
Telecommunications	Telus
Rail	CN
Rail	CP
Water	EPCOR (water)
Gas Pipeline	Pembina
Oil Pipeline	Enbridge
Oil and Gas	Shell

### 3.5.5 Aboriginal Groups

The following 21 Aboriginal groups, listed alphabetically, could be impacted by the project:

Athabasca Chipewyan First Nation	Metis Nation Region 1
Bigstone Cree Nation	Metis Nation Region 5
Chipewyan Prairie First Nation	Metis Nation Region 6
Duncan's First Nation	Mikisew Cree First Nation
Fort McKay First Nation]	Peavine Métis
Fort McMurray #468 First Nation	Peerless Trout First Nation #478
Gift Lake Métis	Sturgeon Lake Cree Nation
Horse Lake First Nation	Sucker Creek First Nation
Kapawe'no First Nation	Whitefish Lake First Nation
Loon River First Nation	Woodland Cree First Nation
Lubicon Lake Band	

### 3.5.6 Economic Development Groups

The following economic development groups were identified as being active in northern Alberta, and therefore were asked for their advice on the study:

- Community Futures Northwest Alberta (CFNWA)
- Edmonton Economic Development Corporation
- Regional Municipality of Wood Buffalo
- Regional Economic Development Initiative for Northwest Alberta

### 3.5.7 Residents of Northern Alberta

All socio-economic data presented in this sub-section has been directly sourced from a previous NADC report<sup>3</sup>

- The NADC region is currently home to 346,000 people, approximately 9.5% of Alberta's total population.
- *In the past decade, the region's labour force has demonstrated an unemployment rate generally in line with the provincial average and a labour force participation rate well above the provincial average. (P.i)*
- *Average individual employment income in the NADC region is estimated to be \$70,000 in 2011, well above the provincial level of \$54,000.(P. ii)*
- *Approximately 10% of the region's population lives on Métis Settlements or First Nations Reserves. A further 13% of the off-reserve population identify as being of Aboriginal heritage (P. 1)*
- The on-reserve Aboriginal labour force in the region has extremely low labour force participation and extremely high unemployment rates.

### 3.5.8 Temporary, Mobile Workers

- *In addition to the permanent population in the region there were an estimated 55,000 mobile workers in the region in 2011, primarily in the Rural Municipality of Wood Buffalo. (P.i)*
- *Of the estimated 55,000 mobile workers in the region, approximately 50% live elsewhere in Alberta, 45% live elsewhere in Canada, and 5% live permanently outside of Canada. (P. i)*
- *Wages paid to mobile workers who live outside Alberta but elsewhere in Canada totaled an estimated \$3 billion in 2011. (p. ii)*

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<sup>3</sup> **Contribution of the NADC Region to the Alberta and Canadian Economies, 2012.** Prepared by Nichols Applied Management and Published by Northern Alberta Development Council.

## 4. Stakeholder Input

### 4.1 Introduction

This Strategic Alignment Section is intended to provide the reader with an understanding of how the project aligns with the goals of key stakeholders, with details provided on alignment with the business plans of Government of Alberta ministries. Also, it incorporates input from impacted municipalities, organizations and a sample of industry.

### 4.2 Strategic Alignment with Government of Alberta Ministries

This sub-section is organized as follows

- Review of the current (2013-16) business plans of related Alberta government ministries and identify goals that the corridor project should help achieve, with a focus on the project's relationship to the government priority initiatives under each goal
- Score the impact the project has on achieving the various business plans' goals, using:
  - High indicates the project is critical to the achievement of the goal
  - Medium indicates the project directly impacts the goal but it is not critical to its attainment
  - Low indicates an indirect impact to the achievement of the goal
- Explain, where not obvious, how the corridor project aligns with or impacts goal

#### 4.2.1 Alberta Transportation

Goal from Ministry Business Plan	Impact Level	Explanation
1. A well-integrated, multi-modal transportation system that supports a growing economy	High	Corridor supports utilization of natural resources (oil, gas, forestry, mining) on lands made more accessible via the corridor and export to western ports, so is aligned with Priority Initiative #1: <i>Develop a multi-modal Transportation Strategy that supports Albertans' priorities, including competitiveness and sustainability.</i>
2. Support environmental stewardship and the quality of life for all communities	High	Multi-use vs. single use corridors for linear infrastructure reduces environmental footprint.  New efficient, east-west route reduces CO <sub>2</sub> emissions from road and rail that would otherwise follow a circuitous route.  Residents near corridor will benefit from increased access to education, healthcare and other services.
3. A safe transportation system that protects Albertans	Low	New road in corridor would shift some traffic away from congested Highway 63.

#### 4.2.2 Alberta Aboriginal Relations

Goal from Ministry Business Plan	Impact Level	Explanation
1. Aboriginal communities and people fully participate in Alberta's economy and society	Medium	By improving transportation access to job opportunities in this region, this project supports Priority Initiative #1: <i>Work with Aboriginal, government and industry partners to increase Aboriginal participation in the workforce and the economy.</i>  Because this project is at the early concept stage, future stages can support Priority Initiative #2: <i>Support Aboriginal economic development through dialogue and engagement to increase Aboriginal capacity to participate in the economy, and help to strengthen Alberta's competitiveness by working with Aboriginal communities on new initiatives to provide for economic opportunities and improve socio-economic outcomes.</i>
2. Alberta's coordinated approach to Aboriginal consultation and land claims enhances resource development certainty	Medium	Because this project is at the very early (concept) stage, future stages can support Priority Initiative #1: <i>Implement the revised Alberta's First Nations Consultation Policy on Land Management and Resource Development to increase the effectiveness of the consultation process.</i>

#### 4.2.3 Alberta Agriculture and Rural Development

Goal from Ministry Business Plan	Impact Level	Explanation
1. A competitive self-reliant industry	Medium	This project improves access to the west coast and key markets thereby supporting Priority Initiative # 1: <i>Work with industry to develop and expand access to key markets in the Asia-Pacific, Mexico, Europe, India and the Middle East.</i>
2. Environmental stewardship	High	This project reflects sound principles of integrated management for transportation thereby supporting Priority Initiative # 1: <i>Develop innovative policies and business models that facilitate the adoption of integrated environmental management practices.</i>
4. A vibrant, resilient and sustainable rural Alberta	Medium	If telecommunications providers use the corridor this project could support Priority Initiative # 1: <i>Work with Service Alberta to enhance high-speed internet access to rural Alberta.</i>

#### 4.2.4 Alberta Energy

Goal from Ministry Business Plan	Impact Level	Explanation
1. Albertans are assured of the benefits from energy and mineral resource development	High	By improving access to vast tracts of northern Alberta, and improving east-west transportation, this project aligns well with Priority Initiative #1: <i>Explore opportunities to develop and expand Alberta's access to key global markets to better serve Alberta's long-term interests.</i>
2. Effective stewardship of Alberta's energy resources and regulatory systems is achieved through leadership and engagement with citizens, communities, industry and governments	Medium	By planning and providing integrated linear infrastructure, this project supports Priority Initiative #1: <i>Collaborate with Environment and Sustainable Resource Development to implement the Responsible Energy Development Act, which establishes an integrated single regulator with responsibility for oil, gas, oil sands and coal.</i>
3. Development of energy related infrastructure and cleaner energy technologies is actively led and supported	High	By reducing travel distances to move products and resources east-west, this project supports these Priority Initiatives: <ol style="list-style-type: none"> <li>1. <i>Work with Environment and Sustainable Resource Development and the federal government to reduce carbon dioxide emissions while not unduly impacting Alberta consumers, government royalties and industry.</i></li> <li>2. <i>Respond to the recommendations of the Retail Market Review Committee to enhance Alberta's competitive retail market so that it continues to meet Alberta's electricity and natural gas needs.</i></li> </ol>

#### 4.2.5 Alberta Environment and Sustainable Resource Development (ESRD)

Goal from Ministry Business Plan	Impact Level	Explanation
1. Desired environmental outcomes for air, land, water and biodiversity are achieved	Medium	This TUC integrates infrastructure to transport resources, representing a proven approach to support Priority Initiative # 1: <i>Advance world-leading resource stewardship through an Integrated Resource Management System that manages cumulative effects and enables and demonstrates the achievement of environmental, economic and social outcomes Albertans expect from resource development.</i>
2. Sustainable natural resource development is achieved	High	This project improves market access to the west coast, thereby supporting Priority Initiative #1 for this goal: <i>Contribute to expanded market access for Alberta's natural resources and products by working with other ministries to advance opportunities for Alberta.</i>

### Additional Comments Provided by ESRD

- Regional plans under the Land-use Framework are the key mechanism for identification of desired economic, environmental and social outcomes associated with land uses.
- The Lower Athabasca Regional Plan (LARP)<sup>4</sup>, initiated in September 2012, includes an outcome where infrastructure development supports economic and population growth in the region.
- A critical economic linkage has been identified linking Fort-McMurray to Red Earth Creek (which provides further linkage to Peace River)<sup>5</sup>.
- Colleagues in Alberta Transportation advise that a corridor study has been completed for potential highway routing from Fort McMurray to Highway 686 at Peerless Lake. We recommend consultation with AT [Alberta Transportation] to ensure study information is being integrated and considered comprehensively.
- LARP also includes strategies to: 1) utilize the minimum amount of land required for developments, and 2) to plan, design and locate development in a manner that utilizes existing infrastructure and minimizes the need for new or expanded infrastructure.
- We anticipate strategies in LARP would carry forward to the Lower Peace Regional Plan. Lower Peace Region (LPR) and Lower Athabasca Region (LAR) are part of the study area.
- Potential Conservation Areas in LPR<sup>6</sup> – the website contains maps and shapefiles and first map in LARP (LAR and LPR conservation and recreation areas).
- Caribou Range Planning is being undertaken in accordance with the Federal Recovery Strategy<sup>7</sup>. Current focus is on Little Smoky Range near Fox Creek.

#### 4.2.6 Alberta Innovation and Advanced Education

Goal from Ministry Business Plan	Impact Level	Explanation
4. Alberta's economy is competitive and sustainable	High	By improving market access to the west coast, for exporting, the project supports Priority Initiative #2: <i>Collaborate with partner ministries to develop and implement the government's market access initiative to maximize the value of Alberta's exports.</i>

#### 4.2.7 Alberta Municipal Affairs

Goal from Ministry Business Plan	Impact Level	Explanation
1. Enhanced long-term viability and accountability of municipalities and their communities	Medium	Municipalities served by the corridor's infrastructure will receive reduced costs, increased revenue and growth opportunities. Residents in these municipalities will receive increased access to education, healthcare and other services.
5. Albertans are protected from the effects of disaster and emergency events through a coordinated and all hazards focused public safety system	Medium	In the event of an emergency in the Fort McMurray region, a new east-west transportation corridor project would provide an alternate route (to Highway 63), for both the servicing of Fort McMurray and any required evacuation.

<sup>4</sup> <https://www.landuse.alberta.ca/LandUse%20Documents/Lower%20Athabasca%20Regional%20Plan%202012-2022%20Approved%202012-08.pdf> Pages 37-64. Accessed Feb 25, 2014.

<sup>5</sup> Ibid. Page 59. Accessed Feb 25, 2014.

<sup>6</sup> <https://www.landuse.alberta.ca/Pages/MapsShapefiles.aspx> Accessed Feb 25, 2014.

<sup>7</sup> <http://esrd.alberta.ca/fish-wildlife/wildlife-management/caribou-management/default.aspx> Accessed Feb 25, 2014.

#### 4.2.8 Alberta Tourism, Parks and Recreation (TPR)

Goal from Ministry Business Plan	Impact Level	Explanation
1. Alberta's tourism products are developed and expanded, and tourism from targeted local, national and international markets is increased	Low	By improving east-west access in northern Alberta, this project supports Priority Initiative # 1: <i>Ensure Alberta grows as a competitive tourism destination.</i>
2. The Alberta parks system provides opportunities for outdoor recreation and tourism and appreciation of Alberta's natural heritage	Low	By improving access to vast areas of northern Alberta, this project enables Albertans of all ages, backgrounds and abilities to connect with nature.

#### Additional Comments Provided by TPR:

Alberta Tourism, Parks and Recreation's 2014-2017 Business Plan goals will be guided by the Tourism Framework. The Peace River-Fort McMurray Transportation and Utility Corridor (TUC) supports the following key priorities:

Alberta's Tourism Framework	Impact Level	Explanation
Innovation and Development: Alberta actively encourages entrepreneurial investment in traveler-focused development of innovative tourism experiences, destination renewal, and new destination areas	Low	The Government of Alberta will be encouraged to formerly identify new, high priority areas for tourism development on Crown lands, in collaboration with other stakeholders and in support of regional planning occurring under the Land Use Framework. By improving east-west access in northern Alberta, this project supports the following Key Objectives: <ul style="list-style-type: none"> <li>- 1.1 Access to public land for tourism development is improved and streamlined by 2016.</li> <li>- 1.2: Destination development areas are identified and planning and approval processes for tourism development are in place by 2016.</li> </ul> The Alberta North Tourism Region is strong in summer outdoor recreation and trails, where there is high demand, and in RV camping with moderate demand. The type of utilities established along the corridor will impact the type and extent of highly/moderately demanded and emerging tourism clusters that could be developed along the corridor. It is not clear what incremental tourism would occur with the development of the TUC and it may be used mostly for business and work crew travel.
Accessibility: Access to Alberta and its tourism regions improves	Low	A key driver of the Tourism Framework is improved destination accessibility whereby strategic highway upgrading and development mechanisms are needed, particularly in relation to the level of rubber tire travel by Albertans and other Canadians within the province. Although indirect, this project will support improved access within the Alberta North Tourism Region.

<p>Alignment: Industry organizations actively align and transparently communicate their efforts in pursuit of our common goals</p>	<p>Low</p>	<p>Stakeholder alignment, communication and commitment ensure sustainable growth in tourism over time. Coordinating efforts across government may promote Alberta’s north as a desirable place to live, work and travel. This project may include development of northern Alberta oil, gas, forestry, mining and agriculture along with tourism, supporting Key Objective 4.4:</p> <ul style="list-style-type: none"> <li>- Recognition, understanding and support of tourism as a major contributor to the Alberta economy increases within government, communities, and among Albertans.</li> </ul>
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**Parks Division:**

Land-use Framework planning exercise outside of the Lower Athabasca Regional Plan may provide some information as it relates to location and routes for the corridor. Also worth noting is that “Significant additional lands (approximately 11,600 square kilometers) have been identified for future inclusion in the parks systems through the *Land-use Framework* regional planning process for the Lower Athabasca Region”

**Recreation and Physical Activity Division:**

The description of the project should include 'recreation trails' as a potential inclusion along all or part of the route.

**4.3 Input from Municipalities**

Municipalities were asked to introduce and consider the following motion:

*That our municipality support the concept of the Fort McMurray-Peace River Transportation and Utility Corridor, linking the two regions.*

The results are summarized in the table below:

Municipality	Result	Comments
City of Grande Prairie	Support	
Grande Prairie	Support	
Regional Municipality of Wood Buffalo	Support	Would provide a much-needed critical secondary route to our region
Birch Hills County		
Clear Hills County	Support	
M.D. of Fairview No. 136	Support	Believe corridor may lead to improved grain transport
County of Northern Lights	Neutral	Do not want to jeopardize other spending priorities of the province
Northern Sunrise County	Support	
M.D. of Opportunity No. 17	Conditional Support	With no financial contribution, conditions outlined on the following page
M.D. of Peace No. 135	Support	
Saddle Hills County		
M.D. of Smoky River No. 130	Support	
M.D. of Spirit River No. 133	Support	
Peace River		

Conditions outlined by MD of Opportunity No. 17 for their support of the Corridor project are

- Develop a stringent, enforceable Environment and Pollution Policy
- Develop an updated Water and Watershed Policy
- Develop a Disaster Plan for the Municipality
- Policies to be developed in consultation with, and support of the MD#17
- Develop Policy Road-Toll Revenue Sharing

#### 4.4 Input from Organizations

Organizations were asked to introduce and consider the following motion:

*That our organization support the concept of the Fort McMurray-Peace River Transportation and Utility Corridor, linking the two regions.*

The results are summarized in the table below:

Organization	Result	Comments
Athabasca Oil Sands Area Transportation Coordinating Committee		Requested more information
Northwest Corridor Development Corporation	Support	
Oil Sands Community Alliance		
Alberta Motor Transport Association (AMTA)	Support	

#### 4.5 Input from Industry

Several industries were contacted to determine their level of support and interest in the TUC. The industries sectors contacted included: electricity, forestry, telecommunications, rail, water and oil and gas industries. Industry representatives were asked general questions regarding their level of interest in the TUC and whether they would consider participating in a partnership for the development of the TUC. The results are summarized in the table below:

Sector	Company	Results	Comments
Electricity	Alberta Power System Operator	Face to face meeting	Indicated a potential need for a 240kV line along the TUC
Electricity	AltaLink	No response	
Electricity	ATCO Power	No response	
Forestry	Al-Pac	Telephone	Very interested in participating in TUC
Forestry	Millar Western	Email	Interested in final report
Forestry	Daishowa-Marubeni International (DMI)	Telephone	Very interested in participating in TUC
Telecommunications	Bell	Email	Not interested unless TUC extends to Grande Prairie
Telecommunications	Telus	No response	
Rail	CN	Email	Not interested in TUC
Rail	CP	No response	
Water	EPCOR (water)	No response	
Gas Pipeline	Pembina	No response	
Oil Pipeline	Enbridge	No response	
Oil and Gas	Shell	No response	

## 4.6 Input from Aboriginal Groups

A required step in the process of developing a corridor is to engage in a formal consultation process with Aboriginal communities impacted by the project. The methodology for selecting Aboriginal groups involved analyzing geographic information on the location of reserves and Aboriginal communities potentially impacted by the corridor (see page 22.)

An introductory letter was drafted for distribution by email and mail to the potentially impacted First Nations and Metis groups advising that the Northern Alberta Development Council (NADC) sponsored a Research and Discussion Paper on a potential Fort-McMurray-Peace River Transportation and Utility Corridor. This paper's objective was to provide an analysis of the economic, social and environmental impacts on the concept-in-principle of building a transportation and utility corridor between Fort McMurray and Peace River to influence in the long-term, the placement of potential development and reduce the accumulative environmental impact.

The letter sought input on the following questions:

- What do you perceive to be the advantages and disadvantages of a transportation and utility corridor in the area?
- What do you perceive to be the opportunities and challenges associated with a corridor in the area?
- Would you like a copy of the final report sent to you?

### Results

As the current input process does not represent consultation, it is recommended that consultation efforts soon begin to develop a better picture of Aboriginal issues, concerns and opportunities associated with a TUC in the region.

Aboriginal communities raised concerns about the corridor including: cultural and spiritual impacts; effect on traditional livelihoods, environmental impacts of the corridor footprint as well as the surrounding area; and harvesting animals, plants and traditional use materials and generational impacts.

## 5. Cost/Benefit Analysis

### 5.1 Methodology

Three scenarios were developed to examine the potential development of a transportation and utility corridor between Peace River and Fort McMurray. The three scenarios are referred to as the "Minimal TUC," "Partial TUC," and "Full TUC" scenarios, as shown in the table below.

	Minimal TUC	Partial TUC	Full TUC
East Road TUC	Yes	Yes	Yes
West Road TUC	No	No	Yes
Rail	No	No	Yes
Oil and Gas	Portion	Portion	Portion
Power	No	Yes	Yes
Water	No	Portion	Portion
Telecommunications	Portion	Portion	Yes

The Minimal TUC scenario is one where only two utilities participate within the east portion of the corridor, between Peerless Lake and Fort McMurray, within the next 10 years. Under this scenario, the east portion of the TUC will be fully developed, with the road sharing portions of the corridor right-of-way with oil and gas and telecommunications utilities.

The Partial TUC scenario is where four utilities participate within the east portion of the corridor within the next 15 years. Under this scenario, the east portion of the TUC will be fully developed, with the road sharing portions of the corridor right-of-way with oil and gas, power, water and telecommunications utilities.

The Full TUC scenario is where six utilities participate within both the east and west portions of the corridor, between Peace River and Fort McMurray, within the next 20 years. Under this scenario, the east road, west road and rail portion of the TUC will be fully developed, with telecommunications and power utilities also developed along the full length of the TUC. The TUC will share portions of the right-of-way with oil and gas and water utilities.

### 5.2 Scope

The TUC is a linear strip of land:

- That has been approved by all regulatory authorities for Transportation and Utility purposes
- That has been secured via outright purchase of ownership or acquisition of right-of-way
- That has a comprehensive environmental plan and mitigation measures, to address such concerns as wildlife protection
- That has been cleared of trees and vegetation for the first planned infrastructure
- That includes the facilities that are a common requirement by two or more types of linear infrastructure (e.g. bridges over major watercourses), including only earthworks (e.g. required for bridges over water courses)
- For which all pipelines, utility lines and structures that would interfere with development activities have been relocated
- For which at least one use (e.g. road) has been approved, funded and scheduled for implementation

The TUC is not:

- The linear infrastructure that transcends the corridor - road, pipe, lines, etc.
- Any facilities that are only a requirement of one type of infrastructure

The table below illustrates key differences between the east and west portions of the corridor which have been incorporated into the model.

	<b>East Portion</b>	<b>West Portion</b>
	Fort McMurray to Peerless Lake	Peerless Lake to Peace River
Distance (km)	218	226
Current Road	None	Hwy 686, oil top
Road Right-of-Way Needed	Yes	No
Utility Right-of-Way Needed	Yes	Yes
Route Selected?	Yes, by Stantec Report	Yes, Follow 686
% Forested, Crown-Owned	Approx. 95%	Approx. 90%

The table below provides a scope definition for the three TUC scenarios

	<b>Minimal TUC</b>	<b>Partial TUC</b>	<b>Full TUC</b>
East Road TUC	100%	100%	100%
West Road TUC	0%	0%	100%
Rail	0%	0%	100%
Oil and Gas	20%	35%	50%
Power	0%	100%	100%
Water	0%	25%	50%
Telecommunications	25%	50%	100%

Notes: Percentages indicate total amount of linear infrastructure within the TUC. Rationale for each percentage is given below.

<b>TUC Component</b>	<b>Minimal TUC</b>	<b>Partial TUC</b>	<b>Full TUC</b>
Description of Scenario	In the minimal TUC scenario, only two utilities participate in the corridor development over the next 10 years, based on current information regarding the project.	In the partial TUC scenario, several utilities participate in the corridor development over the next 15 years.	In the full TUC scenario, all of the utilities participate in the corridor development over the next 20 years, based on current information regarding the project.
East Road TUC	(1) Based on Stantec functional planning study, AOSA CRISP and other supporting information, it seems very likely that this project will proceed within the next 10 years.	Included in scenario. See note (1)	Included in scenario. See note (1)

Research and Discussion Paper, Peace River-Fort McMurray Transportation and Utility Corridor

<b>TUC Component</b>	<b>Minimal TUC</b>	<b>Partial TUC</b>	<b>Full TUC</b>
West Road TUC	Excluded from scenario. See note (2)	Excluded from scenario. See note (2)	(2) A TUC between Peace River and Peerless Lake is only contemplated under the full TUC 20 year scenario due to the fact that a functional plan has not been completed; a road is already in existence, and the level of current transportation demand.
Rail	Excluded from scenario. See note (3)	Excluded from scenario. See note (3)	(3) A rail TUC is only contemplated under the full TUC 20 year scenario due to the potential of the G7G proposal, the poor soil conditions in the east portion of the TUC, and the lack of interest from current rail operators.
Oil and Gas	(4) Based on extensive oil leases within the east portion, oil and gas pipelines are assumed to occupy 25% of the TUC in this scenario.	Included in scenario. See note (4)	(5) Based on extensive oil leases within the east portion and further development of the west portion, oil and gas pipelines are assumed to occupy 50% of the TUC.
Power	Excluded from scenario. See note (6)	(6) A power transmission line will occupy 100% of the east road TUC; based on a major oil sands development in the Peace River area, an additional 240Kv line will be needed to strengthen the transmission infrastructure between Peace River and Fort McMurray.	Transmission line will occupy 100% of east and west road TUC. See note (6)
Water	Excluded from scenario. See note (7)	(7) A water line will occupy 20% of the east road TUC, based on municipal demand for water infrastructure.	Water line will occupy 50% of east and west road TUC. See note (7)
Telecommunication	(8) A telecommunication line will occupy 50% of the east road TUC, based on strong demand for this type of infrastructure from municipal and oil and gas sectors.	Telecommunication line will occupy 75% of east road TUC. See note (8)	Telecommunication line will occupy 100% of east and west road TUC. See note (8)

### 5.3 Cost Estimates

The following cost estimates were derived from public sources of cost information. The cost estimates are Class 5, order of magnitude estimates, useful for evaluating feasibility at this very early stage of project definition.<sup>8</sup> Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges from -50% to +50%.

<b>TUC Component</b>	<b>Order of Magnitude Cost Estimate (in 2013 dollars)</b>
Highway connector between Fort McMurray and Peerless Lake	\$385 million
Highway between Peerless Lake and Peace River	N/A
Rail between Fort McMurray and Peace River	\$2,081 million
Pipeline (cost <b>per km</b> of 12 inch pipeline)	\$1.49 million
Power (cost <b>per km</b> of 240kV line)	\$1.76 million
Telecommunications (cost <b>per km</b> of fiber optic line)	\$8,835
Water line (average cost <b>per km</b> of plastic pipe)	\$383,979

Further details of the cost estimates can be found in Appendix G.

### 5.4 Cost Savings

In this sub-section, cost savings by user participants in a multi-use/common corridor are identified. The table on the following page provides the capital cost savings definitions, categories and framework of the project. Each phase of the project life cycle includes high level project activities and sub-categories within each project activity.

<sup>8</sup> <http://www.aacei.org/non/rps/18R-97.pdf> Accessed March 14, 2014.

**Capital Cost Savings Definitions, Categories and Framework of the Project**

Project Life Cycle	Project Activity	Activity Sub-Category
Project Planning & Route Selection	User Needs Analysis	Roads, rail, oil and gas, power, water, telecommunications
	Preliminary Environmental Assessment	Caribou range
		Fur
		Historical
		Fisheries
		Archaeological
		Forestry
		Vegetation
	Stakeholder Engagement	Soils
		Aboriginals
		Municipalities
		Federal Government
		Provincial ministries
		Residents
	Business case	Industry
		Partners
Alternatives route analysis		
Funding and partnering		
	Conceptual Cost estimate	
	Implementation Plan, including governance	
Procure Land	Land purchases	Contact owners, negotiate agreements, finalize purchase agreements
	Right-of-way	
	Crossing agreements	
Engineering	Design	Clearing, relocations, common infrastructure, environmental mitigation
	Engineering	
	Tendering	
	Project Management	
Construction	Clearing	Tree cutting
		Tree removal
		Stump removal
	Relocations	Utility lines
		Industry pipelines
		Industry facilities
		Public and private roads
	Common Infrastructure	Bridges over major watercourses
		Fencing
		Emergency response
	Environmental Mitigation	Caribou range
		Fur
		Historical
		Fisheries
Archaeological		
Forestry		
Vegetation		
Soils		

The following allocations:

- Provide estimates of the percentage of total capital costs consumed by each phase of a project's life cycle
- Are based on best estimates using knowledge of infrastructure project life cycles.
- Should be considered order of magnitude estimates

<b>Capital Cost Allocation by Life Cycle Category</b>	
Project Planning and Route Selection	10%
Procure Land	5%
Engineering	20%
Construction	65%
<b>Total capital costs</b>	<b>100%</b>

The estimates on the following page are based on the cost savings of developing a multi-use TUC compared to developing single-use corridors.

Project Life Cycle	Minimal TUC		
	East Road TUC	Oil and Gas	Telecommunications
Project Planning & Route Selection	10%	80%	80%
Procure Land	80%	80%	80%
Engineering	40%	40%	70%
Construction	20%	40%	40%
<b>Total capital costs saving</b>	<b>26%</b>	<b>46%</b>	<b>52%</b>

Project Life Cycle	Partial TUC				
	East Road TUC	Oil and Gas	Power	Water	Telecommunications
Project Planning & Route Selection	10%	80%	80%	80%	80%
Procure Land	80%	80%	80%	80%	80%
Engineering	40%	40%	10%	60%	70%
Construction	20%	40%	10%	40%	40%
<b>Total capital costs saving</b>	<b>26%</b>	<b>46%</b>	<b>21%</b>	<b>50%</b>	<b>52%</b>

Project Life Cycle	Full TUC						
	East Road TUC	West Road TUC	Rail	Oil and Gas	Power	Water	Telecommunications
Project Planning & Route Selection	10%	0%	30%	80%	80%	80%	80%
Procure Land	80%	0%	60%	80%	80%	80%	80%
Engineering	40%	0%	10%	40%	10%	60%	70%
Construction	20%	0%	10%	40%	10%	40%	40%
<b>Total capital costs saving</b>	<b>26%</b>	<b>0%</b>	<b>15%</b>	<b>46%</b>	<b>21%</b>	<b>50%</b>	<b>52%</b>

## 5.5 Stakeholders Benefitting

### 5.5.1 Benefits of the Peace River to Fort McMurray TUC

The table below shows what benefits would be enjoyed by which stakeholders if the corridor project were to proceed compared to it not proceeding.

Benefits of The Peace River to Fort McMurray Corridor to Stakeholders														
N.B. These are the benefits of the corridor itself, <b>not</b> Multi-use vs. Single use Corridors														
Category	Specific Benefit	Area Residents	Albertans	Tourists from Out-of-Province	Temporary Workers	Federal Government	Government of Alberta	Local Municipalities	Resource Development Industries	Existing Small Businesses in Region	New Commercial & Industrial Businesses	Road Construction & Related Industry	Utilities - Gas, Power, Water, Telecom	Transportation/Trucking Industry
Social	Create jobs - Direct	X	X			X	X	X		X			X	
	Create jobs - Indirect, Construction	X	X		X	X	X	X		X	X	X	X	X
	Create jobs - Induced e.g. Forestry, Tourism	X	X			X	X	X	X	X	X			X
	2nd access to FM improves emergency safety	X	X	X	X	X	X	X	X	X	X		X	X
	Improved access to health care services	X		X	X		X		X	X	X			
	Improved access to education services	X			X		X		X	X	X			
	Lower cost of living	X			X				X	X	X	X		
	Increased income levels	X					X	X	X	X	X			X
	Popl. growth allows communities to provide a wider range of services and amenities	X		X	X	X	X	X	X	X	X			
Environmental	Reduced transport CO2 emissions	X	X	X	X	X	X	X	X	X				X
	Better access to manage wildfires	X		X	X	X	X	X	X		X		X	X
	Better access to large areas for eco-tourism	X	X	X		X	X	X		X	X		X	
	Reduction in project specific resource roads	X				X	X	X	X					X
Economic	Improved access to resources e.g. oil, gas				X	X	X		X					
	Reduced transportation costs	X			X				X	X	X			X
	Better access to export resources to markets		X			X	X		X		X		X	X
	More options to transport oversized modules					X	X		X		X			X
	Growth in Gross Domestic Product (GDP)					X	X							
	Increased land development abutting corridor										X			
	Increase in property tax revenue						X	X						
	Increase in corporate/business tax revenue	X	X			X	X	X						
	Increase in personal tax revenue		X			X	X							
	Increase in royalty revenue	X	X			X	X	X						
	Increase in revenue from oil and gas leases	X	X			X	X	X						
	Increase in revenue from forestry cutting permits	X	X			X	X	X						
Increase in GST revenue					X									

### 5.5.2 Benefits of A Multi-Use Corridor vs. Single Use Corridors

The table below shows what benefits would be enjoyed by which stakeholders if the corridor project were to proceed as a multi-use transportation and utility corridor, compared to the traditional approach of developing single-use corridors.

Benefits of Multi-Use TUC vs. Single Use Corridors to Stakeholders														
Category	Specific Benefit	Area Residents	Albertans	Tourists from Out-of-Province	Temporary Workers	Federal Government	Government of Alberta	Local Municipalities	Resource Development Industries	Existing Small Businesses in Region	New Commercial & Industrial Businesses	Road Construction & Related Industry	Utilities - Gas, Power, Water, Telecom	Transportation/Trucking Industry
<b>Social</b>	Less overall community disturbance	X		X		X	X	X	X				X	
<b>Environmental</b>	More efficient use of land, less disturbance	X	X	X		X	X	X	X			X	X	
	Reducing trees cut for linear infrastructure	X	X	X		X	X	X	X			X	X	
	Less impact on water courses	X	X	X		X	X	X	X			X	X	
	Less, more efficient environmental mitigation	X	X	X		X	X	X				X	X	
	More comprehensive mitigation possible	X	X	X		X	X	X				X	X	
<b>Economic</b>	Significantly reduced capital cost	X	X			X	X	X	X	X			X	
	Reduced environmental mitigation costs	X	X			X	X	X	X	X		X	X	
	Sooner Infrastructure build-out is possible	X	X		X	X	X	X	X	X	X	X	X	X

### 5.5.3 Stakeholder Differences between East and West Portion of Corridor

The perspective of stakeholders on this project varies significantly, depending upon which portion of the project is being referenced.

Parameter	East Portion	West Portion
Aboriginal Consultation on Route Selection	Extensively done by Stantec; route adjusted to avoid splitting approved Treaty settlement land claim	In concept only, not specific route, process was begun through this project/report (included east portion too)
Aboriginal Concerns	Impacts on traditional way of life, environment, treaty rights, economic opportunities	Requires extensive consultation
Municipal Support	Municipalities in East cautiously supportive but currently have higher infrastructure priorities	Municipalities in West Portion highly supportive, especially if rail service can be improved

## 5.6 External Impacts

The following table summarizes the external negative impacts of the TUC, by component, before mitigation.

		Road	Rail	Oil & Gas	Power	Water	Telecom
Environmental	Noise from traffic						
	Impairment of natural aesthetic and scenic values due to built structures						
	Pollution, sedimentation, and changed discharge regimes into water bodies						
	Increase in unnatural wildlife deaths						
	Change in wildlife migration patterns						
	Barriers causing habitat fragmentation						
	Change in animal behaviour in or along linear intrusion						
	Loss of wetlands						
	Change in surface drainage						
	Loss of trees and CO2 storage						
	Increased fire risk from human activity and desiccation						
	Higher light penetration and desiccation of vegetation						
	Disruption to archeological sites						
	Disruption to historical sites						
	Soil erosion						
	Conduits for invasive of alien species						
	Cutting vegetation resulting in weed proliferation and suppression of native vegetation regeneration						
	Air pollution						
	Disturbance related to construction and maintenance						
Economic	Commercial losses						
	Decrease in Property value and damage						
Social	Health Risks						
	Reduction in isolation						
	Compromised traditional way of life						
	Changes in lifestyle						
<b>Total Negative Impacts</b>		<b>24</b>	<b>25</b>	<b>10</b>	<b>14</b>	<b>9</b>	<b>10</b>

## 5.7 Cost Benefit Model

Using opinions of probable cost estimates from public sources, the capital cost of each infrastructure element was valued. This information was recorded in the first column of the table below and is shown in greater detail in Appendix G.

The next step was to apply cost saving factors to a multi-purpose TUC, using the corridor as the baseline for the cost element savings, (second column). For example, telecommunications cable will have significant (52%) savings when installed in a multi-use corridor with existing right-of-way and alignment already established, trees cleared, etc.

Finally, *Scenario Savings* were subtracted from *Capital Costs* to reach an estimate of *Total Costs* (third column), shown in the table below.

### Costs in millions of dollars CDN

Minimal TUC Scenario	Capital Costs	Scenario Savings	Total Costs
East Road TUC	\$ 385.10	26%	\$ 284.97
West Road TUC	\$ -		\$ -
Rail	\$ -		\$ -
Oil and Gas	\$ 131.93	46%	\$ 71.24
Power	\$ -		\$ -
Water	\$ -		\$ -
Telecommunications	\$ 0.98	52%	\$ 0.47

Partial TUC Scenario	Capital Costs	Scenario Savings	Total Costs
East Road TUC	\$ 385.10	26%	\$ 284.97
West Road TUC	\$ -		\$ -
Rail	\$ -		\$ -
Oil and Gas	\$ 230.89	46%	\$ 124.68
Power	\$ 782.92	21%	\$ 622.42
Water	\$ 42.62	50%	\$ 21.31
Telecommunications	\$ 1.96	52%	\$ 0.94

Full TUC Scenario	Capital Costs	Scenario Savings	Total Costs
East Road TUC	\$ 385.10	26%	\$ 284.97
West Road TUC	\$ -		\$ -
Rail	\$ 2,081.25	15%	\$ 1,779.47
Oil and Gas	\$ 329.84	46%	\$ 178.11
Power	\$ 782.92	21%	\$ 622.42
Water	\$ 85.24	50%	\$ 42.62
Telecommunications	\$ 3.92	52%	\$ 1.88

### Economic Impact

The tables below illustrate the economic impacts for each of the three scenarios, based on Government of Alberta standard economic impacts multipliers and our previous presented costs estimates. Labour income and economic impact are measured in millions of dollars. Employment is measured in person years.

#### Economic Impact Model - Minimal TUC Scenario

	millions	Labour Income	Employment	Economic Impact
Direct spending, transportation	\$ 284.97	\$ 182.09	2668	\$ 529.05
Direct spending, rail	\$ -	\$ -	0	\$ -
Direct spending, oil and gas	\$ 71.24	\$ 47.90	646	\$ 141.11
Direct spending, power	\$ -	\$ -	0	\$ -
Direct spending, water	\$ -	\$ -	0	\$ -
Direct spending, telecommunications	\$ 0.47	\$ 0.22	3	\$ 0.79
<b>Total</b>	<b>\$ 356.69</b>	<b>\$ 230.21</b>	<b>3317</b>	<b>\$ 670.95</b>

#### Economic Impact Model - Partial TUC Scenario

	millions	Labour Income	Employment	Economic Impact
Direct spending, transportation	\$ 284.97	\$ 182.09	2668	\$ 529.05
Direct spending, rail	\$ -	\$ -	0	\$ -
Direct spending, oil and gas	\$ 124.68	\$ 83.82	1130	\$ 246.94
Direct spending, power	\$ 622.42	\$ 299.53	4376	\$ 965.02
Direct spending, water	\$ 21.31	\$ 15.88	480	\$ 38.80
Direct spending, telecommunications	\$ 0.94	\$ 0.44	6	\$ 1.58
<b>Total</b>	<b>\$1,054.33</b>	<b>\$ 581.76</b>	<b>8661</b>	<b>\$ 1,781.40</b>

#### Economic Impact Model - Full TUC Scenario

	millions	Labour Income	Employment	Economic Impact
Direct spending, transportation	\$ 284.97	\$ 182.09	2668	\$ 529.05
Direct spending, rail	\$1,779.47	\$ 1,067.22	14191	\$ 2,932.79
Direct spending, oil and gas	\$ 178.11	\$ 119.75	1615	\$ 352.78
Direct spending, power	\$ 622.42	\$ 299.53	4376	\$ 965.02
Direct spending, water	\$ 42.62	\$ 31.75	960	\$ 77.61
Direct spending, telecommunications	\$ 1.88	\$ 0.88	13	\$ 3.15
<b>Total</b>	<b>\$2,909.48</b>	<b>\$ 1,701.22</b>	<b>23822</b>	<b>\$ 4,860.39</b>

## 5.8 Summary of Results

The following tables show the results of the cost benefit analysis model.

### 5.8.1 Economic Impact Summary

The economic impact of the model is based on economic multipliers obtained from the Alberta Economic Model, managed by Alberta Treasury Board and Finance.<sup>9</sup>

Indicators from the Alberta Economic Impact Model	Minimal TUC	Partial TUC	Full TUC
Increase in person years of employment	3,317	8,661	23,822
Increase in labour income	\$230,209,045	\$581,755,247	\$1,701,217,136
Increase in economic impact	\$670,949,449	\$1,781,395,456	\$4,860,394,921

### 5.8.2 Project Impact on Socio-Economic Indicators

The socio-economic indicators are based on the percentage increase of Northern Alberta GDP for each of the TUC scenarios.

Other Economic Indicators**	Year	Base Value	Minimal TUC	Partial TUC	Full TUC
			Project GDP as a % of Northern Alberta GDP		
			1.6%	4.3%	11.9%
Wages paid to mobile workers who live outside Alberta but elsewhere in Canada	2011	\$2,900,000,000	\$47,457,400	\$126,001,142	\$343,784,031
Wages paid to mobile workers from elsewhere in Alberta	2011	\$3,000,000,000	\$49,093,862	\$130,346,009	\$355,638,653
Wages Paid to Permanent employees, who live in Region	2011	\$11,100,000,000	\$181,647,290	\$482,280,233	\$1,315,863,015
GDP Contribution	2011	\$41,000,000,000	\$670,949,449	\$1,781,395,456	\$4,860,394,921
Export of goods and services to the rest of Canada (25% of Alberta's total)	2008	\$13,000,000,000	\$212,740,069	\$564,832,706	\$1,541,100,829
Purchase of goods & services imported from the rest of Canada. (10% of Alberta's Total)	2008	\$6,000,000,000	\$98,187,724	\$260,692,018	\$711,277,305
Personal income taxes paid by individuals working in the region to Province	2011	\$820,000,000	\$13,418,989	\$35,627,909	\$97,207,898
Personal income taxes paid by individual working in the region in 2011 to feds	2011	\$2,000,000,000	\$32,729,241	\$86,897,339	\$237,092,435
Mobile workers paid federal and provincial income taxes in their home jurisdictions.	2011	\$862,000,000	\$14,106,303	\$37,452,753	\$102,186,840
Corporate Income taxes from the region paid provincially	2011	\$611,000,000	\$9,998,783	\$26,547,137	\$72,431,739
Corporate Income taxes from the region paid federally	2011	\$922,000,000	\$15,088,180	\$40,059,673	\$109,299,613
Royalties on oil sands, conventional oil, & natural gas within region (17% of Total)	2011-12	\$5,000,000,000	\$81,823,103	\$217,243,348	\$592,731,088

<sup>9</sup> Alberta Economic Multipliers, Alberta Treasury Board and Finance, 2009.  
<http://www.finance.alberta.ca/aboutalberta/archive-economic-multipliers.html>

### 5.8.3 Summary of Quantifiable Benefits and Costs

The table below provides a summary of quantifiable benefits and costs.

<b>Summary of Scenario Benefits and Costs</b>			
	<b>Minimal TUC Scenario</b>	<b>Partial TUC Scenario</b>	<b>Full TUC Scenario</b>
Total Scenario Benefits (millions)	\$670.95	\$1,781.40	\$4,860.39
Total Scenario Costs (millions)	\$356.69	\$1,054.33	\$2,909.48
Benefits minus Costs (millions)	\$314.26	\$727.07	\$1,950.91
Benefit to Cost ratio	1.88	1.69	1.67
Increase in years over Minimal TUC Scenario	-	5	10
NPV @ 10% discount (millions)	\$314.26	\$451.45	\$752.16

Net Present Value (NPV) is calculated as Total Scenario Benefits less Scenario Costs, then applying an appropriate discount rate. A discount rate of 10% has been used as per recommendation from Transport Canada<sup>10</sup>. NPV for Partial TUC Scenario is based on taking 5 years longer, on average, than the Minimal TUC Scenario. NPV for Full TUC Scenario is based on taking 10 years longer, on average, than the Minimal TUC Scenario.

<sup>10</sup> Guide to Benefit-Cost Analysis in Transport Canada. Government of Canada, 1994.

## 6. Funding Alternatives

One of this project's original objectives was to *identify potential partners to fund parts of the corridor or infrastructure within, to join Alberta Transportation, with its road interest.*

### 6.1 Description of Funding Alternatives

The matrix below outlines an assessment on “*who could pay for what?*” The table lists major cost items down the left side and the potential funders (by categories) at the top.

Cost Type	Specific Cost	EXISTING STAKEHOLDERS											NEW					
		Government			Aboriginal	Resource Industries				Utilities				Telecommunications	TUC Commission	Partnerships		
		Municipalities	Government of Alberta	Federal Government	First Nations	Metis	Forestry	Oil & Gas	Agriculture	Mining	Power	Water	Rail					
Common One-Time Capital	Project Planning																	
	Stakeholder engagement																	
	Environmental Assessment & Mitigation																	
	Land & R.O.W. Acquisitions																	
	Relocations																	
	Clearing																	
	Common Infrastructure																	
Infrastructure Specific One-Time Capital	Road																	
	Rail																	
	Oil & Gas																	
	Power																	
	Water																	
	Telecom																	
Infrastructure Specific Recurring Operations	Road																	
	Rail																	
	Oil & Gas																	
	Power																	
	Water																	
	Telecom																	

In creating this funding matrix, the following assumptions or principles were established:

- The full TUC scenario would be implemented
- The cost items match the cost-benefit analysis presented in preceding Section 5
- The list of potential funders and the cost items they might fund is based on
  - The funder receive some benefits associated with the costs
  - Potential spending is within their current authority according to enabling legislation

## 6.2 Funding Input from Potential Funders

The table below summarizes the input from three potential funding participants. There was only one potential funder contacted who clearly indicated they did not want to participate as a funder. The lack of response from other potential funders is likely due to the early stage of project development and overall project complexity.

Funder Category	Potential Funder Name	Potentially Funding These Items
Government of Alberta	Alberta Transportation	East Portion of Corridor: - Common one-time capital - Road one-time capital Both East and West Portions of Corridor: - Road - recurring operations
Resource Industry	AI-Pac DMI	Clearing land of trees Provide existing data and GIS information

## 6.3 Potential New Participants

To implement the TUC will likely require establishing one or more new organizations, to meet governance, coordination and funding requirements. Two possibilities have been identified under the preceding chart and further described below.

### 6.3.1 TUC Administrator

The term “TUC Administrator” has been chosen to mirror the administrative framework used for Calgary and Edmonton’s TUCs, described at the end of Section 2 of this report. While different in scope and objectives from the Peace River to Fort McMurray corridor, the Calgary and Edmonton TUCs provide an excellent base from which we can learn and adapt, especially in terms of definitions, enabling legislation and administrative framework. For the Peace River to Fort McMurray TUC, the Administrator could be Alberta Infrastructure, another existing organization or a new organization, provided they have the appropriate powers, granted under enabling legislation. As per the Calgary and Edmonton model, the TUC Administrator roles are:

- *Regulate the use of all lands within the TUC*
- *Purchase the TUC lands*
- *Sell TUC lands that become surplus to the program needs*
- *Manage the lands*
- *Issue authorizations to any individual, organization or company before they undertake a surface disturbance*

The Administrator must also have or be granted the required tools to effectively and efficiently carry out the above mandate, such as the ability to grant leases, licenses and rights-of-way.

Because the Administrator is responsible for protecting the common, public good, likely the Administrator would be a publicly funded (i.e. government funded) agency, although an appropriately structured not-for-profit organization could also be considered.

### 6.3.2 Partnerships

The term *partnerships* is broad by intent and includes the sub-types outlined below:

#### **Public-Private Partnerships (P3)<sup>11</sup>**

There are two requirements in Canada for a project to be considered a P3:

- Relates to the provision of public services or public infrastructure.
- Necessitates the transfer of risk between partners.

The official definition is:

*“A cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards”.*

Public-private partnerships span a spectrum of models that progressively engage the expertise or capital of the private sector. At one end, there is full contracting out as an alternative to traditionally delivered public services. At the other end, there are arrangements that are publicly administered, but within a framework that allows for private finance, design, building, operation and possibly temporary ownership of an asset.

Alberta has significant experience with P3 projects, especially in the transportation sector.

#### **Private-Private Partnerships**

This type of partnership involves two or more private companies joining forces and contributing funds to create a third entity to pursue an activity of common interest. For the Peace River Fort McMurray TUC, this type of partnership is likely high probability because of the following factors:

- Many large corporations involved in resource extraction
- Common corporate goals, especially to improve moving product to markets
- Transportation and utility infrastructure are shared by all firms
- Strong and recent history of working together in other strategic initiatives such as environmental monitoring, research, and mitigation

#### **Public-Public Partnerships**

This type of partnership involves two or more public entities joining together and contributing funds to create a third entity to pursue an activity of common interest. If this type of partnership were to emerge it would likely be the federal and provincial governments joining around one or more of the following goals:

- Support Aboriginal communities with economic development
- Support resource industries to improve access to export markets
- Protecting the natural environmental

#### **Hybrid Forms of Partnerships**

The combinations of potential partnership structures are almost endless, when hybrids are considered. For example, if the Government of Alberta, the Federal Government, and Canadian Pacific were to form a partnership, it would be categorized as a Public-Public-Private Partnerships. A relatively new form of hybrid partnership is the not-for-profit or philanthropy sector help fund projects with public and private partners, giving rise to such terms as P4.

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<sup>11</sup> The Canadian Council For Public-Private Partnerships: [http://www.pppcouncil.ca/aboutPPP\\_definition.asp](http://www.pppcouncil.ca/aboutPPP_definition.asp)

## 7. Conclusions and Recommendations

### 7.1 Conclusions about Multi-Use Transportation and Utility Corridors in General

1. The costs associated with developing a multi-use transportation and utility corridor across an area are lower than the status quo option of developing individual single use corridors across a larger area.
2. The social and environmental benefits associated with developing multi-use transportation and utility corridors are higher than the status quo option of developing single use corridors.
3. Therefore, there is a positive cost-benefit of developing multi-use transportation and utility corridors instead of the status quo option of single use corridors.
4. Recognizing the very positive cost-benefit of a multi-use transportation and utility corridor compared to single use corridors, there are two established and planned corridors in Alberta, around Edmonton and Calgary, but none elsewhere, due to the following inter-related barriers:
  - a. Land is cheap and/or mostly crown owned in remote areas, so right-of-way acquisition is relatively easy and low cost;
  - b. Lack of driving forces;
  - c. Lack of a champion, to drive and manage the process;
  - d. It represents a change from the normal development process;
  - e. Requires extensive co-operation of a wide range of single purpose private and public stakeholders;
  - f. Requires compromises and trade-offs including adjusting routes of the single purpose corridor users;
  - g. Real long-term comprehensive planning has only recently begun in our resource rich, northern areas;
  - h. Government tools and processes, such as the CRISP plans, to facilitate or require this approach are only beginning to be developed; and
  - i. Stakeholders' lack of understanding of
    - o the status of various components and portions of the corridor,
    - o long lead times and phases entailed for such a large, complex undertaking,
    - o the important role that the new Comprehensive Regional Infrastructure and Sustainability Plans and the Regional Plans play in the planning of new infrastructure and corridors.

## 7.2 Conclusions about the Peace River to Fort McMurray Multi-Use TUC

1. Many key stakeholders view this as two separate initiatives (i.e. east and west portions) which in turn impact almost every aspect of the project, including costs, benefits, priority and timing.
2. Despite the significant benefits associated with a complete link created by a Peace River to Fort McMurray TUC, to date there is much more support and consensus for the east portion of the Corridor due to a wide range of factors:
  - a. A highway already exists in the west portion connecting Peace River to Peerless Lake;
  - b. The connector from Peerless Lake to Fort McMurray has been planned for many years and has been incorporated into the area CRISP and Regional Plan;
  - c. Proper consultation with Aboriginal groups has been done for the east portion but not the west portion;
  - d. The oil and gas industry, a key influencer in the region, sees many benefits to the east portion of the connector, such as improving access to the oil and gas leases in the area;
  - e. The Government of Alberta's priorities and timing of capital spending for transportation and other infrastructure are largely driven by industry input through the CRISP;
  - f. The east portion of the corridor is now identified in the Athabasca Oil Sands Area CRISP for implementation in the 2015-2025 time period; however, the multi-use aspect of the west portion has not yet been incorporated into the Peace Oil Sands Area CRISP.
3. Utility uses and their additional right-of-way requirements were a minor consideration in route planning and selection to date in the report prepared by Stantec.
4. The route for the east portion that was proposed by Stantec may need to be adjusted to better accommodate the needs of additional partners such as oil pipeline and utility operators.
5. A road does not necessarily have to be the first linear infrastructure built within the multi-use corridor, as has been the situation in recent history.
6. A strong champion with the required authority is needed to drive the corridor project.
7. The implementation framework from the successful Edmonton and Calgary TUCs can be modified to apply to the Peace River to Fort McMurray TUC.
8. The cost-benefit analysis reveals that the Minimal TUC scenario has the highest benefit to cost ratio.
9. The TUC scenarios (Minimal, Partial, Full) are not mutually exclusive and therefore the faster any TUC scenario can be started, the better the overall result.

### **7.3 Recommendations about TUCs in General**

All recommendations are directed towards the Government of Alberta.

1. Develop a comprehensive and integrated strategy to transport resources and commodities by road, rail and pipeline.
2. During project planning and route selection, consider the requirements of all potential users for TUCs, not just roads or the first infrastructure/utility to be built.
3. Undertake benchmark research on multi-use TUCs outside urban areas to learn lessons from others. Undertake this research with a global scope and no geographic limit.
4. Engage Alberta Infrastructure to examine the governance and administrative framework in place for the Calgary and Edmonton TUCs, to determine if and how this framework or a modified version could be applied for TUCs outside urban areas.
5. Ensure that coordinating mechanisms or processes are in place to consider land use and infrastructure issues that are common across planning areas such as the Comprehensive Regional Infrastructure Sustainability Plans for the Peace River and Athabasca Oil Sands Areas.
6. Consider improving the sharing and updating of public information on significant government and private sector projects in Alberta, starting at the early planning stages.
7. In recognition that developing effective multi-use transportation, utility and energy corridors will require significant changes to our norms, sponsor a research paper on barriers to implementation including identification, root causes, classification and removal or minimizing these barriers.

### **7.4 Recommendations about the Peace River to Fort McMurray TUC**

8. Appoint a cross ministry team including Aboriginal Relations, Environment and Sustainable Resources, Energy, Transportation, with the Oilsands Sustainable Development Secretariat or Alberta Infrastructure as the interim champion for this project, to guide the next steps.
9. Review the route for the east portion of the corridor based on a comprehensive analysis of all the requirements of all potential users for TUCs, not just the road.
10. Review and adjust the right-of-way requirement for the east portion of the corridor based on all user requirements, including setbacks.
11. Recognize the west portion of the corridor as a legitimate project and plan for route evaluation and selection as a key first step.
12. Undertake detailed discussions with potential funding partners to identify who could contribute what to the various components of this project.

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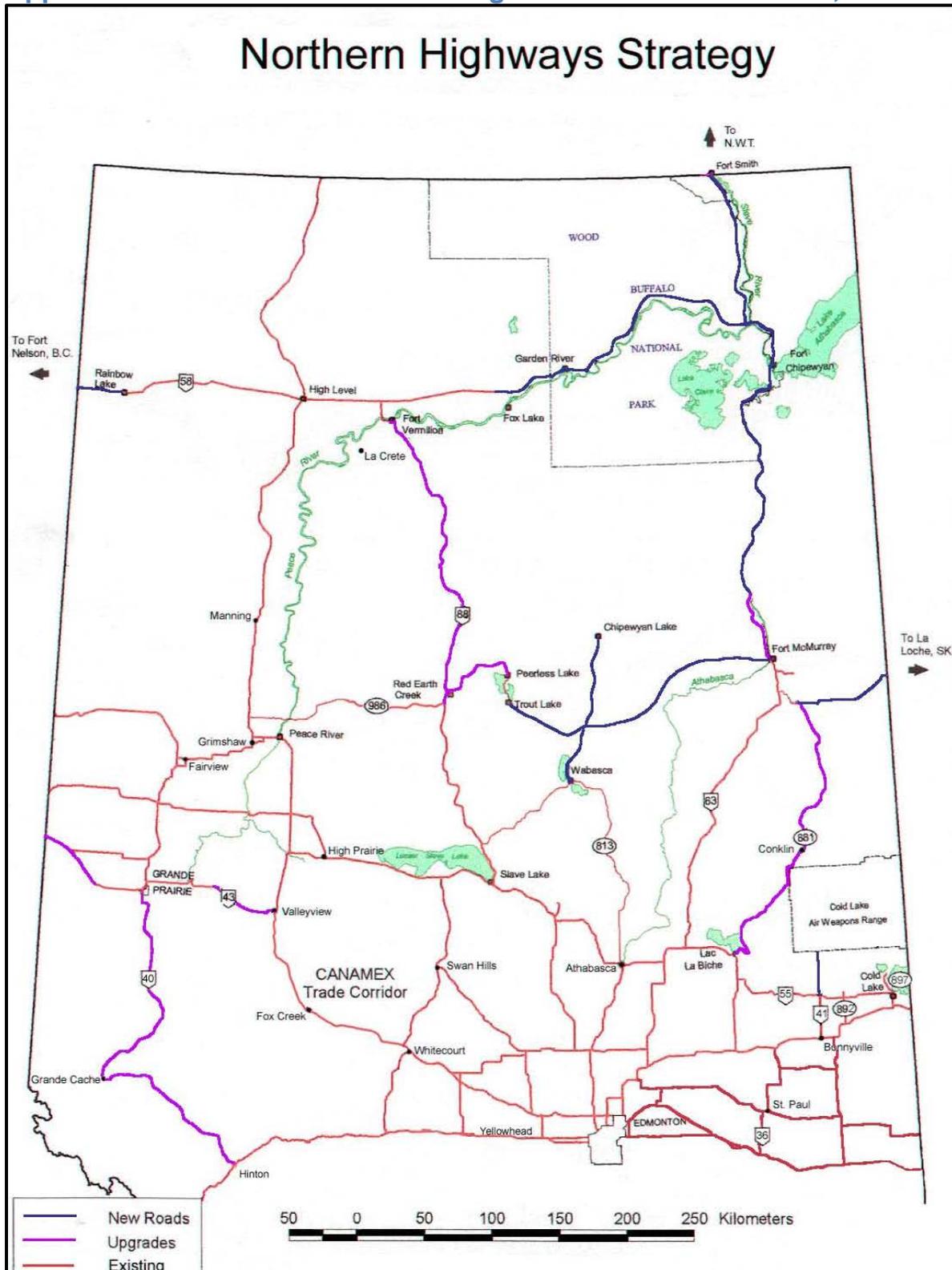
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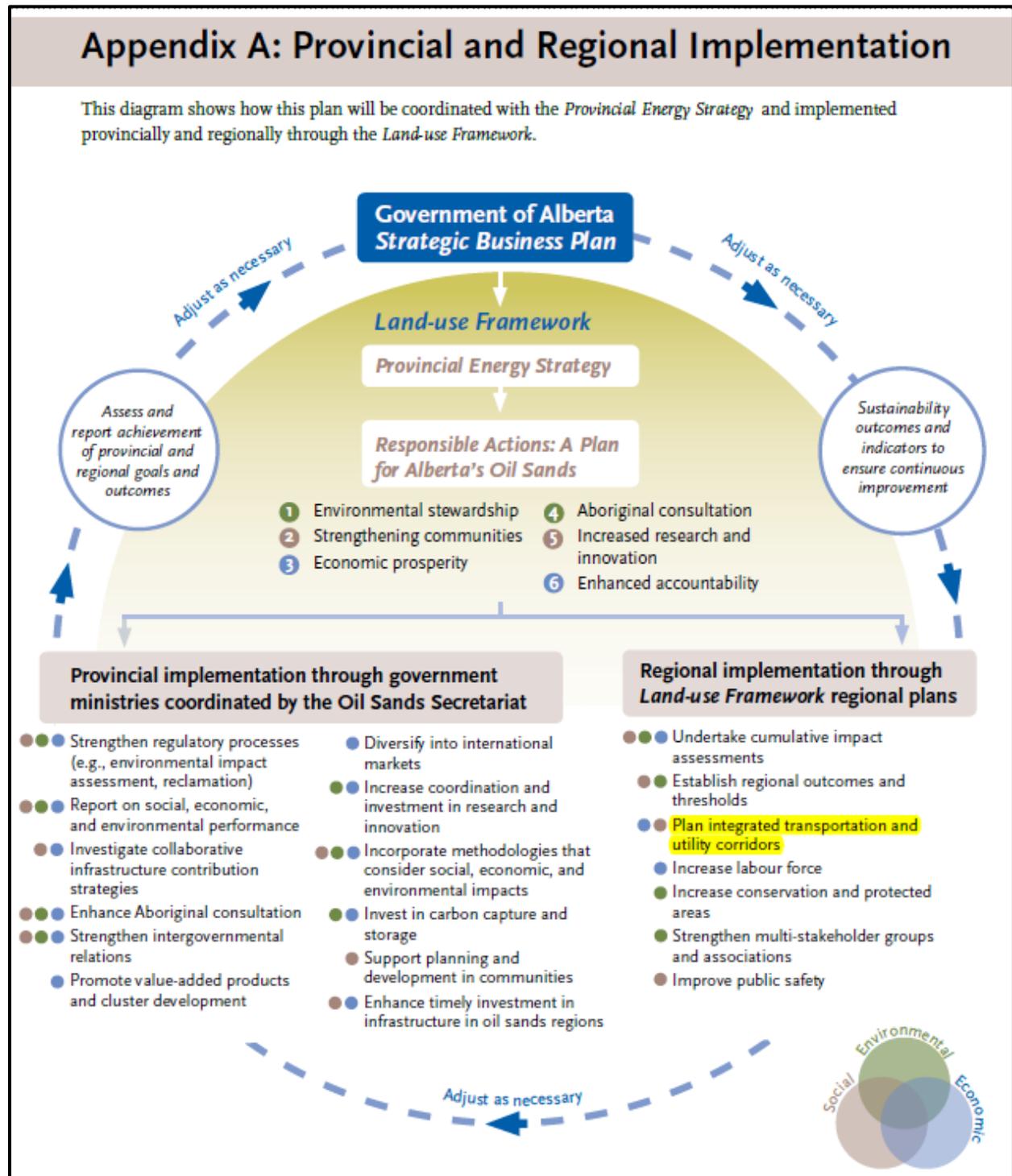
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## **8. Appendices**

Appendix A - Northern Canadian Integrated Road Network Plan, 1998



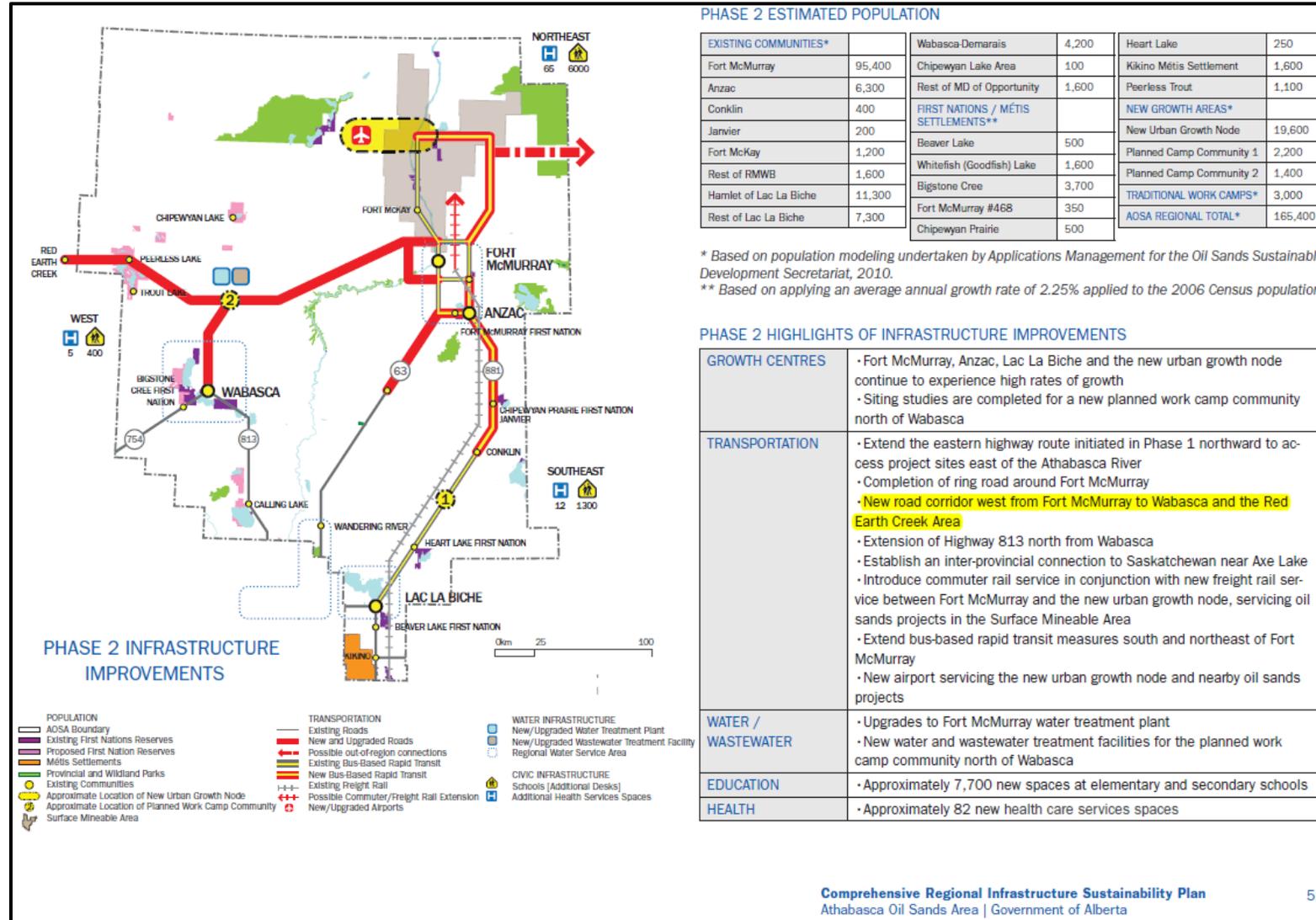
## Appendix B – Excerpt from Responsible Actions: A Plan for Alberta’s Oil Sands



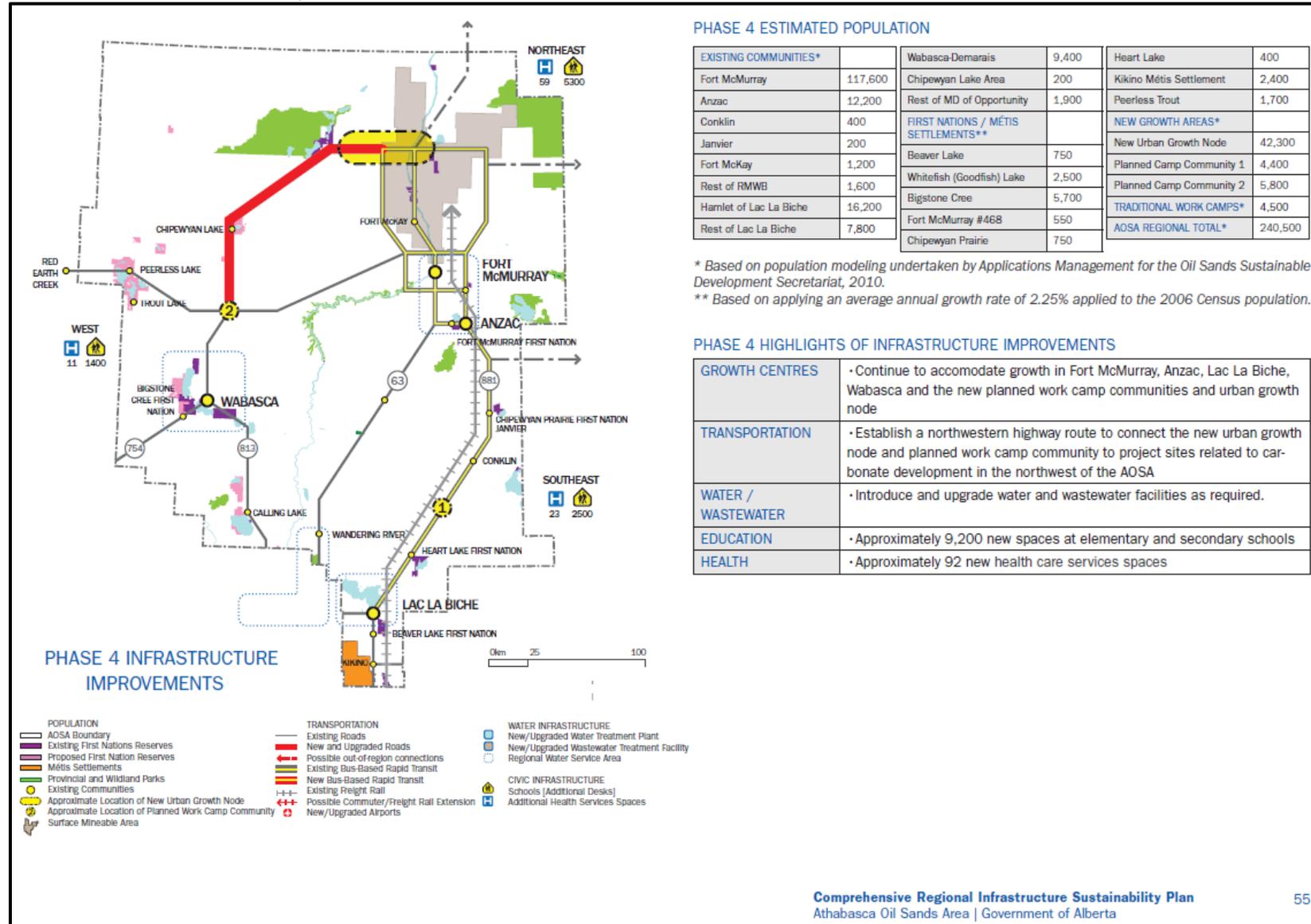


## Appendix D – CRISP for Athabasca Oil Sands Area

### CRISP - Phase 2 Overview 2015-25



CRISP - Phase 4 Overview, 2035-2045



PHASE 4 ESTIMATED POPULATION

EXISTING COMMUNITIES*		Wabasca-Demerais	9,400	Heart Lake	400
Fort McMurray	117,600	Chipewyan Lake Area	200	Kikino Métis Settlement	2,400
Anzac	12,200	Rest of MD of Opportunity	1,900	Peerless Trout	1,700
Conklin	400	FIRST NATIONS / MÉTIS SETTLEMENTS**		NEW GROWTH AREAS*	
Janvier	200	Beaver Lake	750	New Urban Growth Node	42,300
Fort McKay	1,200	Whitefish (Goodfish) Lake	2,500	Planned Camp Community 1	4,400
Rest of RMWB	1,600	Bigstone Cree	5,700	Planned Camp Community 2	5,800
Hamlet of Lac La Biche	16,200	Fort McMurray #468	550	TRADITIONAL WORK CAMPS*	4,500
Rest of Lac La Biche	7,800	Chipewyan Prairie	750	AOSA REGIONAL TOTAL*	240,500

\* Based on population modeling undertaken by Applications Management for the Oil Sands Sustainable Development Secretariat, 2010.  
 \*\* Based on applying an average annual growth rate of 2.25% applied to the 2006 Census population.

PHASE 4 HIGHLIGHTS OF INFRASTRUCTURE IMPROVEMENTS

GROWTH CENTRES	• Continue to accommodate growth in Fort McMurray, Anzac, Lac La Biche, Wabasca and the new planned work camp communities and urban growth node
TRANSPORTATION	• Establish a northwestern highway route to connect the new urban growth node and planned work camp community to project sites related to carbonate development in the northwest of the AOSA
WATER / WASTEWATER	• Introduce and upgrade water and wastewater facilities as required.
EDUCATION	• Approximately 9,200 new spaces at elementary and secondary schools
HEALTH	• Approximately 92 new health care services spaces

**CRISP – Rationale for Multi-Use Corridors**

4.0 THE CRISP

4.9 MULTI-USE CORRIDORS

Multi-use corridors represent an opportunity to consolidate a number of land uses within a defined area, thereby reducing land fragmentation and environmental impacts. Assembling multi-use corridors for the siting of future energy and transportation infrastructure is a key element of the *Provincial Energy Strategy* and will involve a process that will engage affected stakeholders. A similar objective is identified in the *Land-use Framework (LUF)*, which calls for the development of a transportation and utility corridor strategy.

As oil sands production in the AOSA increases, so too will the demand for new utility corridors. Figure 4.9.2 below illustrates future point sources of new demand for bitumen, diluents, natural gas, electricity, and carbon transmission capacity at 6.0 million barrels per day of production.

Future natural gas and electricity demand will be highest north of Fort McMurray, supporting hot water for bitumen extraction from mineable oil sands and the upgrading of the bitumen to synthetic crude oil. Natural gas demand will also be high in the Conklin area where it is used to generate steam in SAGD operations. Many of these oil sands facilities will use cogeneration facilities and will be both users and producers of electricity. Either way, the region will need to be well connected to the electricity generating hub west of Edmonton.

Synthetic crude oil and bitumen is pipelined out of the region, while bitumen requires diluents to make it pipeline-ready, so there will be a need to expand existing pipeline systems to import diluent. The well-developed hydrocarbon industry cluster in the Edmonton region is the most likely terminus of oil pipelines and origin of diluent pipelines, suggesting one or more multi-use corridors for product and diluents pipelines between Edmonton and the AOSA.

There is also a growing interest in capturing carbon to meet greenhouse gas reduction objectives. The most likely candidates for carbon capture in the AOSA are the upgraders north and south of Fort McMurray, which are large facilities that produce relatively concentrated carbon streams. Opportunity for carbon capture at mine locations is more limited, as it is related to mobile equipment and therefore hard to capture. Similarly, carbon capture at in-situ facilities is possible, but limited in scope due to the relatively small size of individual in situ projects. The first storage facilities for carbon are only now being considered, but getting carbon from the AOSA upgraders to a future storage facility would also require

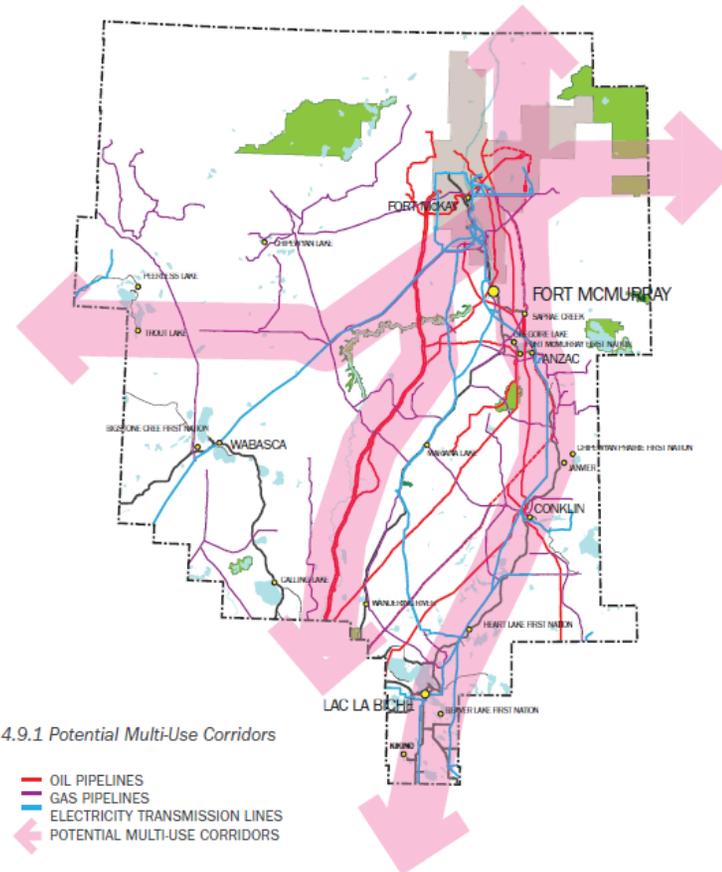


Figure 4.9.1 Potential Multi-Use Corridors

- OIL PIPELINES
- GAS PIPELINES
- ELECTRICITY TRANSMISSION LINES
- ← POTENTIAL MULTI-USE CORRIDORS

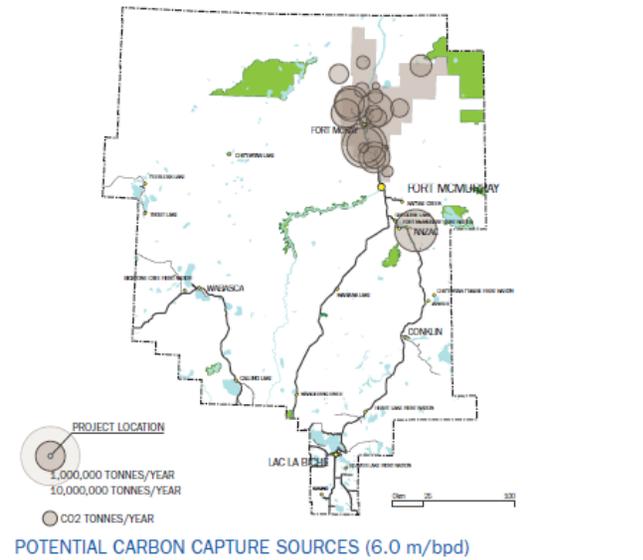
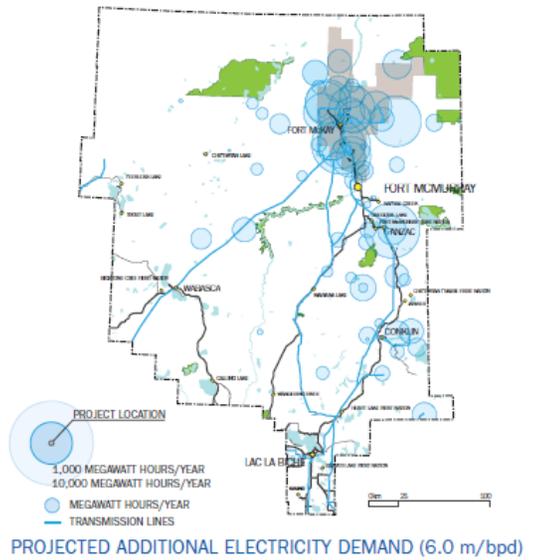
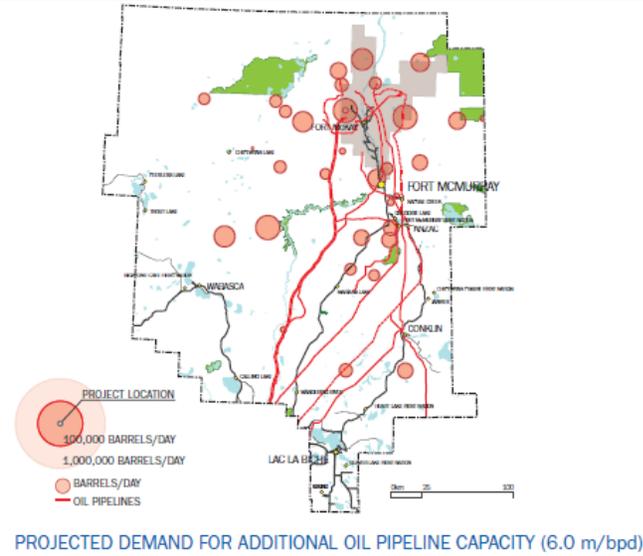
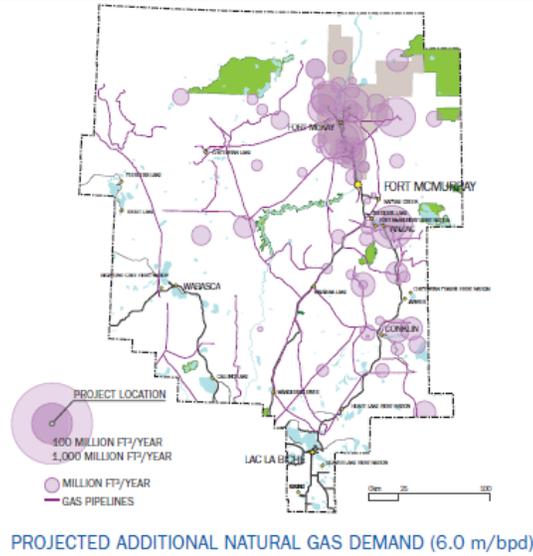
new pipeline capacity.

Considering these future new point sources along with the CRISP transportation network, a number of potential opportunities for multi-use corridors emerge, as illustrated in Figure 4.9.1. As detailed planning is undertaken for the linear infrastructure corridors contemplated by the CRISP, opportunities should be explored to minimize land fragmentation and environmental impact through the consolidation of these facilities into multi-use corridors.

**CRISP – Additional Utility Corridor Requirements**

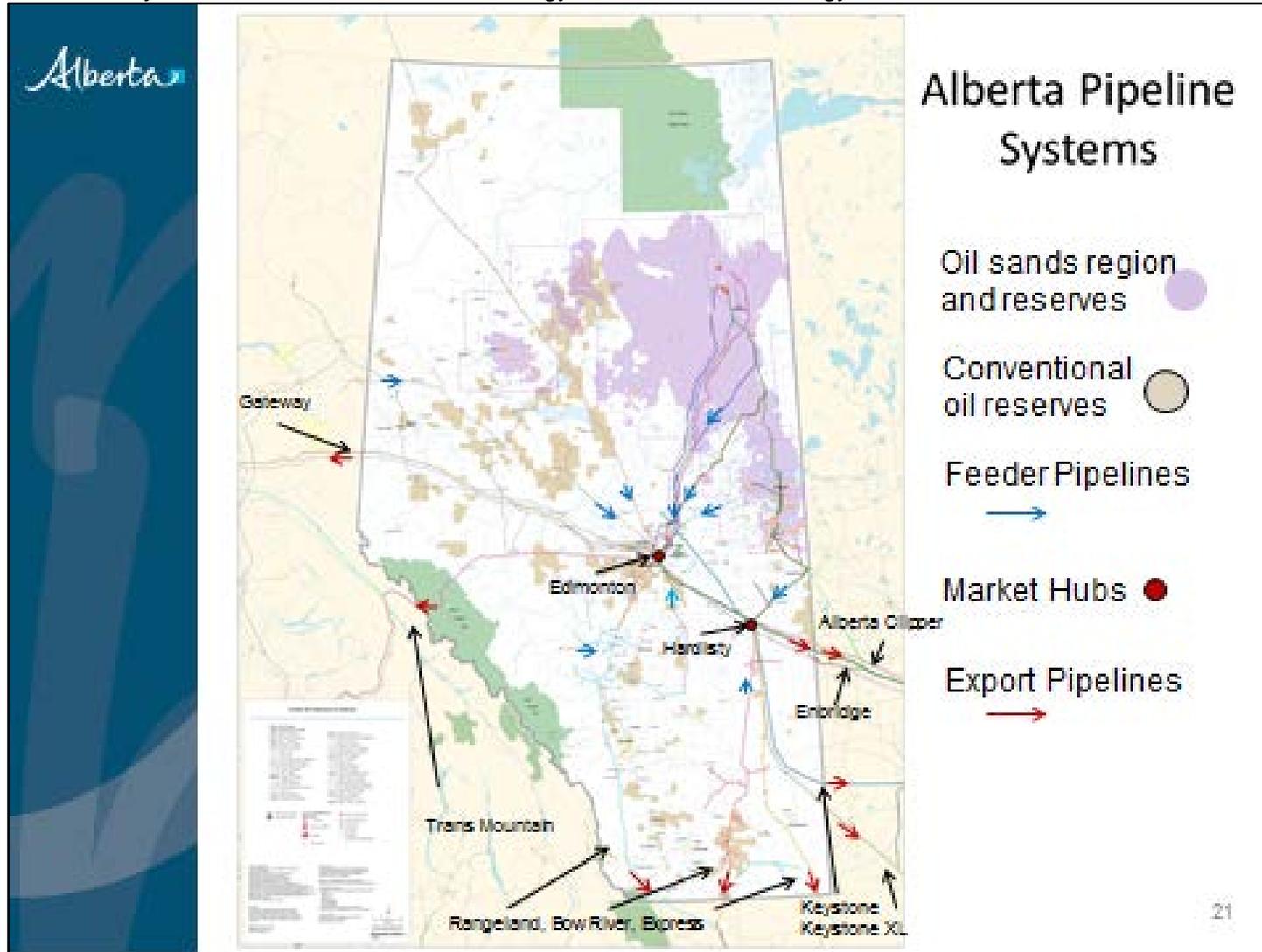
Figure 4.9.2  
Additional Utility Corridor  
Requirements  
(6.0 million/bpd)

Source: Adapted from CERI  
data.



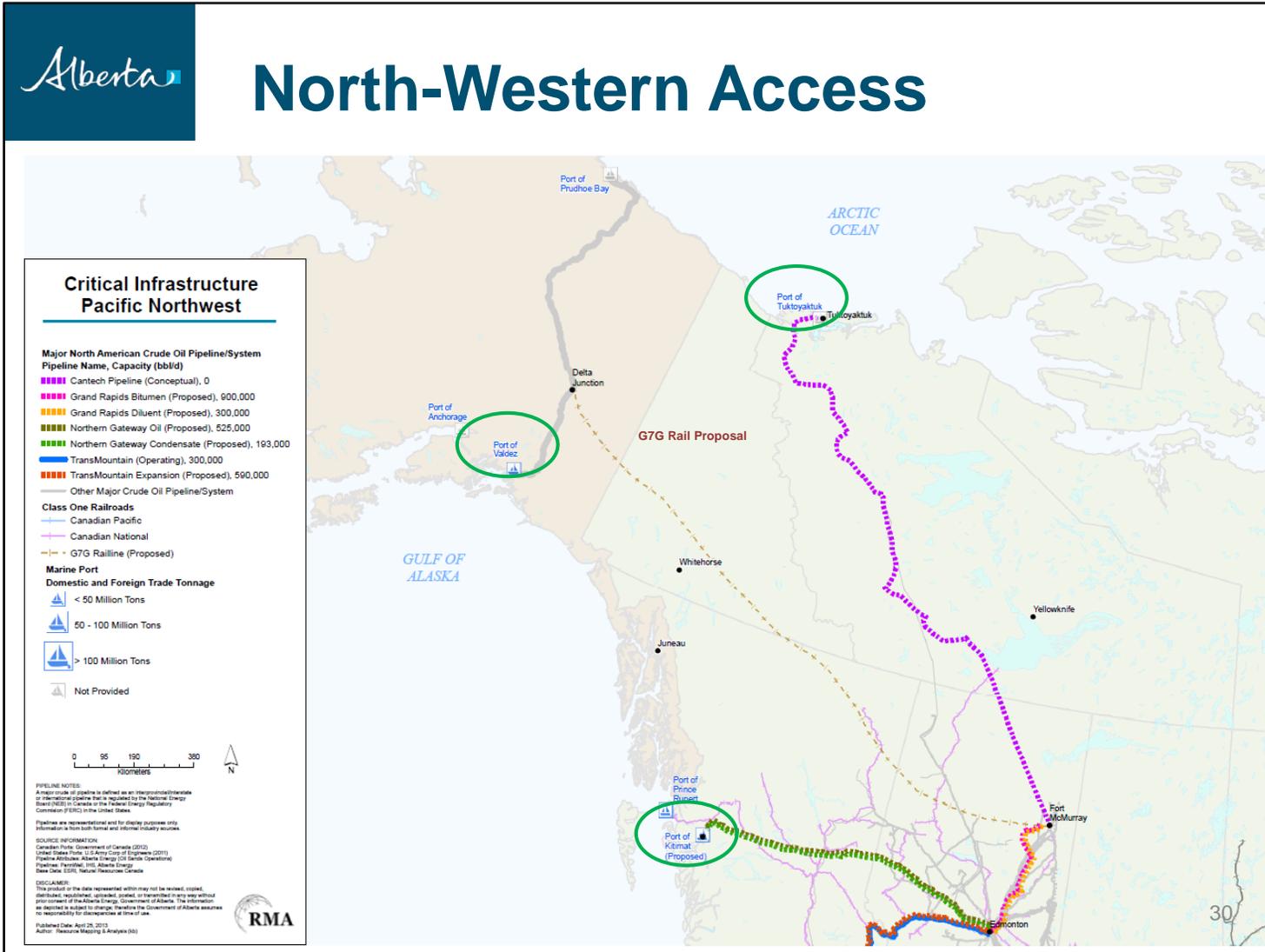
### Appendix E – Alberta Pipeline Systems from - Oil Market Access: Alberta’s Situation 2013

Presented by: Al Sanderson, Chief ADM, Strategy Division, Alberta Energy



## Appendix F – G7G Rail Proposal Shown in Oil Market Access: Alberta’s Situation 2013

Presented by: Al Sanderson, Chief ADM, Strategy Division, Alberta Energy Appendix F



### Appendix G – Detailed Costing

<b>Opinion of Probable Cost – East West Connector (\$M)</b>	
Site Clearing and Grubbing	52.3
Topsoil and Subsoil Stripping	8.4
Prepare Subgrade First Layer	16.9
Common Excavation	69.6
Overhaul	5.8
Borrow Excavation	27.9
Overhaul	14
Geotextile for Stabilization	6.5
Gravel Surfacing	9.4
Bridges	16.6
Culverts	35.8
Creek Diversion	1
Pipeline Lowering	3.2
Total Roadwork Components	267.4
Contingency (20%)	53.5
Engineering (10%)	32.1
Mobilization (10%)	32.1
Opinion of Probable Cost	385.1
*Costs do not include Environmental Mitigation Costs	
Source: Stantec	

<b>Rail TUC Cost Estimates</b>	
	<b>G7G Railway</b>
Capital Cost estimate (\$M)	\$ 12,000
Total length (miles)	1,600
Total length (km)	2,560
Portion within Peace River- Fort McMurray TUC (km)	444
Percentage within TUC	17%
Capital Cost estimate within TUC (\$M)	\$ 2,081
Source: <a href="http://www.alaskajournal.com/Alaska-Journal-of-Commerce/February-Issue-2-2014/Report-due-in-March-on-Canadian-Alaska-oil-railroad-link/">http://www.alaskajournal.com/Alaska-Journal-of-Commerce/February-Issue-2-2014/Report-due-in-March-on-Canadian-Alaska-oil-railroad-link/</a>	

**Pipeline Cost Estimates**

Cost Estimate Description	Cost per unit
Ziff: Cost per pipeline diameter inch per mile	\$ 200,000
OGJ: Cost per pipeline diameter inch per mile	\$ 196,200
Average cost	\$ 198,100
Cost for 12 inch pipeline per mile	\$ 2,377,200
Cost for 12 inch pipeline per km	\$ 1,485,750

Source: Ziff Energy Group

Source: Oil & Gas Journal's Pipeline Economics Report 2013

Source: <http://www.undergroundconstructionmagazine.com/2012-pipeline-construction-report>

**Power Cost Estimates**

	Material	Engineering	Construction	Total Cost/km
2 – 1033 Conductor on 240kV Towers (100 – 150 km)	\$ 584,000	\$ 61,000	\$ 1,132,000	\$ 1,777,000
2 – 1033 Conductor on 240kV Towers (20 – 30 km)	\$ 669,000	\$ 133,000	\$ 1,509,000	\$ 2,311,000
2 – 795 Conductor on 240kV Towers (30 – 50 km)	\$ 578,000	\$ 23,000	\$ 601,000	\$ 1,202,000
			Average total cost per km	\$ 1,763,333

Source: AESO Capital Cost Benchmark Study For 240kV Transmission and Substation Projects, June 2013

**Telecommunications Cost Estimates**

	Cost per unit
US DOT RITA - 2010-2013 Projects cost per mile	\$14,136
USD to CDN Conversion rate	1.0
Average total cost per km (\$CDN)	\$8,835

Source:

<http://www.itscosts.its.dot.gov/its/benecost.nsf/DisplayRUCByUnitCostElementUnadjusted?ReadForm&UnitCostElement=Fi+ber+Optic+Cable+Installation+&Subsystem=Roadside+Teleco+mmunications+%28RS-TC%29>

<b>Water Cost Estimates</b>			
Municipality	Length	Replacement Cost	Cost per meter
Wawa - all water lines	31,517	21,460,152	\$681
Rural Alberta - 8" line			\$250
Rural Alberta - 10" line			\$280
Rural Alberta - 12" line			\$325
	Average total cost per meter		\$384
	Average total cost per km		\$383,979

Source: Corporation of the Municipality of Wawa - Municipal Asset Management Plan, December 31st, 2013  
 Source: GS Holdings, Underground water infrastructure bids for 2013

## Appendix H – Previous Reports, 1995-2010

### **1995 *Telecommunications: Improved Access by Shared Resources - Conference Proceedings***

While this conference did not discuss any form of TUC, the participants agreed on the need for their northern organizations to do more with less, meaning they must search for new ways to serve clients. Benefits that northern Alberta organizations expected from telecommunications technologies included:

- Improved access to information services
- Reduced administrative costs
- Distance education delivery
- Business opportunities related to telecommunications

### **1996 *Transportation Opportunities in the Peace Region***

The Peace Region of Alberta and British Columbia is landlocked, so in order to export commodities, it needs access to rail and road transportation at affordable rates. This need is even more critical because the economy of the region is based on commodities that are subject to global, cyclical markets and intense competition.

### **1998 *Northwestern Canadian Integrated Road Network Plan (NCIRNP)***

The Western Premiers adopted NCIRNP, a concept plan, for future highway development in northwestern Canada.

*“The NCIRNP provides a vision for the integration of road development in northwestern Canada...Many northern highways have been extensively studied and discussed amongst community, industry and provincial officials. Based on these consultations, key northern Alberta highway development projects were identified in the Network Plan. These highways support the current northern road network, while providing new regional and inter-provincial linkages” (P. 8 of Northern Highways Strategy)*

Amongst the priority future highway projects identified in The NCIRNP was the Northern Alberta East-West Highway Corridor, as shown in Appendix A

### **1998 *Prefeasibility Study of Grain Handling and Transportation Alternatives for the Peace Region***

This prefeasibility study, prepared by GTS Group International, examined grain transportation alternatives in northern Alberta. The study examined the most economical methods of moving grain from the Peace Region to markets such as central and southern Alberta, the United States, and internationally:

- *“The least cost alternative for communities including Keg River and south is to truck to Dawson Creek for transfer to rail to Prince Rupert.” (P.i)*
- *“With a 50% backhaul, trucking to Prince Rupert is the most economical alternative...” (P.i)*

The factors linking grain handling and the Corridor project are:

- The Corridor project facilitates additional east-west rail capacity
- Increases transportation options for shipping construction materials, equipment and commodities to Fort McMurray and region and oil shipments out of the region to west coast ports

**2001 The Potential for Northern Participation in the Exploration and Development of Non-Energy Mineral Mines in Northern Alberta**

This report articulated the possibility and impact of a commercial mineral development (i.e., diamonds, gold, base metals or uranium) in northern Alberta:

*“Statistically, the odds of finding a commercial mineral deposit in northern Alberta are good. However, for certain minerals such as diamonds, the odds of finding a viable diamond deposit in northern Alberta are excellent based upon the fact that more than 50% of the discovered kimberlite pipes found to date (a total of 45 kimberlites) in northern Alberta are reported to be diamondiferous. The development of a viable diamond mine in northern Alberta is a strong reality and the potential benefits of such should not be ignored even if the development occurs distant from settlement areas or northern communities.” (P.i)*

The factors linking non-energy mineral mining and the Corridor project are:

- The Corridor project facilitates mining exploration and development
- The Corridor project provides enhanced transportation and utility alternatives to serve the mining industry

**2003 Peace Region Access to Container Transportation**

This discussion paper, prepared by PROLOG Canada, examined potential opportunities for restructuring the rail/road intermodal system in northern Alberta. The paper surveyed container users in the Peace Region and found:

- *“The most likely market segment to move immediately to a regional rail service is 5,400 containers/year of Asia Export container traffic. Most of this is compressed hay loaded into containers at origin by shippers on or close to rail.” (P.8)*
- *“The inbound "big box" market surveyed is equivalent to 4,500 containers per year and shippers of one third of that traffic (1,500 containers) indicated that rail container transportation might be considered under the right cost and service circumstances.” (P.12)*

The factors linking container transportation and the Corridor project are:

- The Corridor project facilitates additional east-west rail and truck capacity
- Increases transportation options for shipping commodities to Fort McMurray and region and oil shipments out of the region to west coast ports

**2003 Developing the Northwest Corridor – The Potential for Agricultural Development in the Fort Vermilion-Fort Nelson Corridor**

Authored by The Mackenzie Municipal Services Agency, Schedule 15 to the report contained a table, outlining objectives and strategies for transportation and utility corridors. (PP. 96-97)

<b>Objectives</b>	<b>Strategies</b>
Maintain transportation routes and utility corridors	Provide for highways to be improved
Maintain opportunities for communication sites, repeaters sites, airstrips	Provide for utility corridors and sites to be constructed to accommodate tie-ins, upgrades to existing and twinning of existing pipelines
Provide opportunities for new transportation, utility corridors and communication sites outside of protected areas	Provide for new roads to be constructed for industrial, commercial and recreational use

<i>Reduce wildlife/vehicle interactions (e.g. caribou, moose)</i>	<i>Inventory and research to determine most effective method to use. (Examples of projects that have been tried with some success are signing, seeding with non-palatable species and use of road deflectors)</i>
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#### **2004 Corridor Planning Study**

This study was prepared by AMEC on behalf of Alberta Transportation. It was done to identify and evaluate possible east-west routes to connect Highway 686 to highway 63. Two potential routes were evaluated (north and south) and the study concluded that the south route was preferable due to it being a shorter route, with fewer muskeg deposits and water crossings and a lower construction cost.

#### **2005 (Circa) Northern Connector Business Case**

While not an in depth analysis, this document contributes positively to the discussion with specific pertinent passages outlined below.

- *“The development of a container port in Prince Rupert, B.C. gives a new impetus to northern Alberta’s international trade opportunities.” (P. 1)*
- *“With the Governments of Alberta and Saskatchewan recent announcement of an all-weather road link from La Roche, Saskatchewan to Fort McMurray, Alberta, the time is right to vigorously promote the development of a connecting highway between the Regional Municipality of Wood Buffalo...” (P. 1)*
- *“There is a Memorandum of Understanding between the Government of Alberta and the Government of the Northwest Territories that gives Alberta an opening to play a leading role in enhancing the development of the NWT..... As such, the development of the connector road as part of an integral northern transportation network becomes all the more vital”. (P. 2)*
- *“This corridor is an essential also in the Government of Alberta’s 20-year strategic plan, the Value Added Strategy, and the Alberta International Marketing Strategy. It can create upgrading and value added opportunities in agriculture, forestry, oil and gas, refining and power generation in and for the North as well as diversification of markets with the coastal port connections. These would provide the bulk of shipments from the port of Prince Rupert.” (P. 5)*
- *“The highway corridor will provide another means of access to the Fort McMurray area, a critical consideration in light of events that, from time-to-time, close other access routes in the area.” (P. 7)*

#### **2007 Alaska Canada Rail Link – Phase 1 Feasibility Study – Research Report**

In 2005, the governments of the State of Alaska and the Yukon Territory agreed to study the feasibility of a rail link connecting Alaska and the Yukon with the railroad system in British Columbia. This research report listed and summarized all the supporting research papers prepared for the feasibility study. More than 13 market research reports were prepared in support of the overall feasibility study. The executive report summarized the key findings of the feasibility study:

- *“Market research forecasts rail traffic that can build incrementally.” (P.iii)*
- *“Technical route research and engineering estimates set out working scenarios.” (Piii)*
- *“Business case assessment predicts financial capacity to recover full system cost.” (Piii)*
- *“Strategic environmental assessment previews policy level sustainability impacts.” (Piii)*

A new east-west rail line in the corridor could connect to the Alaska Canada Rail Line, thereby providing more options to access Asia-Pacific markets

**2008 Northern Highways Strategy**

This report articulated the important role that highways play in the development of the north:

*“Much of northern Alberta’s economy is tied to the development of natural resources, movement of commodities, and the inter-relationship between regions. Based on these considerations, the Province of Alberta must strive to build and maintain an effective highway system in northern Alberta. Highways are also vital in reducing the isolation of northern communities and expanding lifestyle options for northerners. The rationale for this “one priority approach” is based on the significant need for northern highways and the significant revenues generated as a result of resource development in northern Alberta. It makes economic sense to undertake these projects now as a way to capture the future potential of the north while provincial revenues are available. It also insures that infrastructure is in place for future value added and non-energy development.” (P. 7)*

**2008 Initiatives to Maximize Economic and Social Impacts from Major Projects in the North**

Forum members had developed and published a framework for maximizing economic and social benefits from major projects in the north in 2005 and 2006, based on inventorying national and international best practices. The framework has 7 components and 52 implementation methods. A sample of the more relevant implementation methods is provided in the table below:

**Reference Framework (PP 4-5)**

<b>Component</b>	<b>Implementation Method</b>
Mobilization of resources	Formal creation of a joint, multilateral maximization committee
Intention of the promoter	Signing of cooperation and partnership agreements for committing the resources
State intervention	Regulatory readiness in terms of planning, arbitration, monitoring, regulation and enforcement
Community Involvement	Support for starting up businesses
Capacity building in the community	Contracts and employment for local residents
Integration of innovative practices	Willingness to question conventional practices
Monitoring System	Identify and mitigate negative impacts

At the 2008 Forum, based on two years of implementation testing the Ministers reviewed and confirmed the framework. They also identified some missing elements, including:

- *“Industry memorandum of Understanding with First Nations and/or Economic Development Departments: Memoranda of understanding allow the project promoter to make a commitment to implement measures that will meet Aboriginal needs and maximize local and regional impacts.” (P. 7)*

- *“Good Cooperation Between Governments and Ministries: For example, in Alberta, The Oil Sands Sustainable Development Secretariat collaborates with ministries, industry, communities and stakeholders to address the social, environmental and economic impacts of oil sands development.” (P 7)*

### **2009 *Developing Northern Alberta: Northern Challenges, Assets and opportunities: A Discussion Paper, Conference Proceeding***

Amongst the advice that attendees of this conference offered to meet the challenges faced by their business and communities were the following:

- *“Foresight in the development of infrastructure including transportation, power... and communication facilities is a very high priority. The importance of partnership, cost sharing and acceptable level of service is vital.” (P. 27)*
- *“Strategic partnerships must be formed between governments, business, industry, communities and individuals.” (p. 28)*
- *“Socio-economic ties with other northern jurisdictions should be promoted to champion infrastructure investment in order to reduce our carbon footprint and facilitate more economical transportation of resources.” (P. 28)*

### **2009 *Responsible Actions: A Plan for Alberta’s Oil Sands***

This is a 20-year strategic plan that was intended to provide for innovative, collaborative and responsible development of the oil sands within the three oil sands regions and the Industrial Heartland. It included this reference to multi-use corridors:

*“The development of a multi-use corridor strategy for Alberta is in progress. The strategy will support regional growth and promote a multi-use corridor approach for future development of needed provincial transportation and energy infrastructure. The Lower Athabasca Regional Plan will provide advice on general locations of major transportation and utility corridors in the region and the considerations that must be addressed by the Government of Alberta in planning the specific locations.” (P. 6)*

In the **Summary of Alberta Strategic Business Plan** *“Plan integrated transportation and utility corridors”* (P. 44) is cited as a key action for Regional Implementation through Land-use Framework regional plans. The summary graphic is provided in Appendix B.

The goal and objectives outlined in this oil sands report of most relevance to this TUC were:

*“3-4. Maximize industrial infrastructure and address workforce needs to support economic development of the oil sands.*

*3.4.2 Expedite development of integrated transportation and utility corridor plans for the oil sands regions and Alberta’s Industrial Heartland to appropriately facilitate growth and minimize the environmental impact.*

*3.4.3 Establish innovative partnerships with industry, the federal government and municipalities to facilitate timely investment in infrastructure.*

*3.4.5 Increase the participation of Aboriginal communities and individuals in all areas of the workforce and support their participation in economic development of the oil sands.” (P. 27)*

### **2009 *Northern Municipal Infrastructure Required Investment Scan***

The report summarizes a NADC survey of northern Alberta municipalities for their current and future infrastructure needs. The most relevant parts of this report contribute to the subject of road infrastructure funding:

- *“Increased oil field activity in the last 15 years has resulted in traffic and strain on road systems. Although municipalities collect a substantial amount of taxes from the activity, it still is not enough to rebuild the amount of roads that require attention.” (P. 7)*
- *“Increased activities from users outside (i.e. oilfield) give back little or no monetary input into upgrading.” (P. 8)*
- *“Need to address the inherent higher costs (fuel, aggregate, cement, asphalt) associated with doing work in the rural areas outside of the Edmonton-Calgary corridor.” (P. 7)*

## **2009 Changing Northern Economies: Helping Northern Communities Build a Sustainable Future**

Many of the issues addressed by the Northern Ministers at this forum apply directly to the corridor project, at a high level:

- *“Jurisdictions pointed to the continued importance of resource industries in the northern economy. Some noted the importance of new transportation initiatives and a potential increase in the importance of tourism.” (P. 160)*
- *“Respondents referred to shortcomings in transportation infrastructure that resulted in prohibitive transportation costs affecting all sectors of the economy, including tourism.” (P. 17)*
- *“New transportation initiatives, tourism and knowledge-based activities are not yet as important as existing resource industries but they represent the main drivers for economic diversification of the region.” (P. 22)*

Of the solutions and best practices offered at the forum, the ones with direct relevance to the corridor project were:

- *“Governments must look beyond traditional sectoral approaches. Rather than forming policy in a more holistic and integrative way, policies based on a sectoral approach focus on one sector, for example... transportation...” (P. 3)*
- *“Economic development partnerships can draw together multiple stakeholders, expanding the bottom line to look beyond purely economic outcomes and include the social, cultural and environmental dimensions of community development.” (P. 3)*
- *“...concerns relating to environmental impacts and the recognition of Aboriginal rights have led to new opportunities for local populations to become involved in economic decision-making....New partnerships are being formed between Aboriginal and other local groups, government and industry that have the potential to diversify the northern economy and lead to more effective and sustainable forms of resource management.” (P. 22)*

## **2010 Power Generation Options for Northern Alberta’s Municipalities, Organizations and Residents**

This report was authored by Forte Business Solutions. While readers are cautioned that electricity supply and demand has changed since this report was issued, the findings of most relevance to the corridor project are provided below.

- The Northeast region (Fort McMurray and area) has been and will continue to be a high growth for electricity demand. Increased demand will be met by Co-generation projects and planned new large KV lines from the Heartland area to Fort McMurray. (P. 5)
- The Northwest region (Peace Area) is characterized as compromising 33% of the area of Alberta, but only requiring 10% of the province’s power. The area has and will continue to have significantly more demand than local generation,

resulting in transfers from Lake Wabamum (530 MW) and Fort McMurray (755 MW) generation.

- The Peace and Fort McMurray regions are connected via one 240 kV transmission line owned and operated by ATCO.

This Forte report includes a summary of the Alberta Government's Provincial Energy Strategy of 2008, including seven major programs to enhance electricity's role as a facilitator of economic development in Alberta. Amongst these programs is:

- *"Assemble multi-use corridors to energy and transportation infrastructure."* (P. 28)

## **2010 Northern Infrastructure**

Participants cited the following approaches to funding of northern infrastructure:

- Federal Indian and Northern Affairs Programs  
They said they were to be evaluating and adjusting programs to reflect the particular demands of a northern remote environment
- Aboriginal Partnerships  
To develop skills, and improve program and funding access, some built into land claim agreements
- Natural Resource Revenue  
*"Revenue generated from natural resource production is directly injected into the local economy to either solely fund regional/municipal development or to provide stimulus for project partnerships."* (P. 11)
- Public Private Partnerships  
PPP Canada Inc. administers a fund that encourages P3 projects.

Considerations for jurisdictions in developing northern infrastructure include:

- Building public-private and Aboriginal partnerships
- More emphasis on long-term planning and local buy-in
- Program criteria and funding should recognize and adapt to remote and northern circumstances

## **2010 Rail Freight Service Review Panel - If We Continue to Operate as We Do Now We Will Continue to Get What We Are Getting)**

Published By: Northern Alberta Development Council

This discussion paper examined potential opportunities for restructuring the rail/road intermodal system in northern Alberta. The paper identified several symptoms of an ineffective transportation system and examined ownership alternatives, other jurisdictions, and other sectors for best practices. Suggestions included:

- *"The [rail] system must do its part to meet other objectives such as: economic and regional development, improve access to the territories, [and] contribute to the reduction of greenhouse gas emissions."* (P.6)
- *"Separation of infrastructure and operations is possible but it is important to learn from the mistakes of others."* (P.10)