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Lake Athabasca Region Road Access: Considerations for Federal-Provincial Cost Sharing

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Introduction

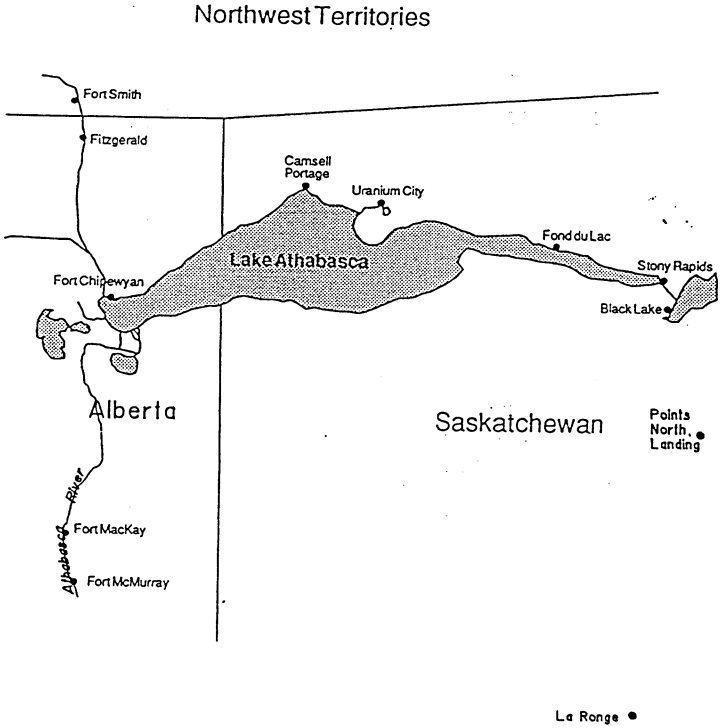
Saskatchewan Highways & Transportation (SHT) recently undertook a detailed cost/benefit analysis for a proposed road project to serve Lake Athabasca communities. This was done in preparation for federal-provincial cost share negotiations, which are in progress. The project background, study methodology and results are included in the following report.

Background

The isolated communities of Camsell Portage, Uranium City, Fond du Lac, Stony Rapids and Black Lake (see regional map on next page) have no road access. Their total population is about 2000 to 2500[1], with about 75% being First Nation residents living on reserves at Black Lake & Fond du Lac.

Settlements in the Lake Athabasca Region date back to the inland waterway fur trading routes of the early 1800's and beyond. Uranium City was formed in 1953 as a service centre for extensive nearby uranium mining activities. With a town population of nearly 3000, and its heavy industrial activity, Uranium City helped support regional services, including transportation. The abrupt closure of Uranium City mines in 1982 changed the nature of regional services dramatically. The emphasis shifted eastward, and today the Stony Rapids/Black Lake area is generally considered to be the hub of the Athabasca Region.

[1] Camsell Portage 61; Uranium City 197; Fond du Lac 754 (incl. 720 on-reserve treaty status); Stony Rapids 169; Black Lake 1073 (incl. 1010 on-reserve treaty status). Total estimated population = 2254. Statistics from 1992 Sask Health and Prince Albert Grand Council.



LAKE ATHABASCA REGION MAP

The above communities are presently served by private barge operators from Fort McKay, Alberta, scheduled and charter air services, and occasionally private winter roads constructed for special project hauls. Barge carriers haul the vast majority of "base goods[2]", about 4500 tons/yr. Since present barge volumes are only about 20% of those prior to mine closures at Uranium City, tariffs are very high. There is no direct subsidy on barge freight, but the Canadian Coast Guard (CCG) provides annual dredging and navigational aids on the Athabasca River Barge System.

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2 "Base goods" are those required for ordinary consumption, by the general public and government services. Average annual volumes used for freight saving calculations were obtained from recent surveys. The bulk fuel portion of barge volumes is 2850 tons (63% of 4500 ton total).

Perishable goods, mail and emergency supplies are handled by air services, primarily from road's end at Points North, Saskatchewan. Air freight accounts for about 1000 tons/yr of base goods. Canada Post subsidizes air freight in the Athabasca Region to a small extent. Air is also the only means of personal travel. SHT operates airstrips at all of these communities except Black Lake, which is connected by road to Stony Rapids.

The lack of all-weather road access places a burden on area residents because:

- The cost of living is nearly double that in the south
- There is virtually no chance for local economic development due in large part to the competitive barriers of inordinately high freight costs
- The only employment opportunities are in mines to the south, and in providing local services
- Approximately 80% of the region's residents are on social assistance
- Perishable foods, necessary for healthy diets, are neglected due to the extreme cost

Not surprisingly, local residents and leaders heavily support road access and have lobbied for a road for many years. All weather road access, along with improved education and training, will provide the foundation to enable this long term cycle of dependence to be broken.

Fort Chipewyan, Alberta enjoys public winter road access to Fort McMurray in addition to barge and air service. They are becoming more dependent on the winter road for cheaper freight. They too seek all weather road access, and until such time will require some level of barge service. Therefore, any decisions effecting the future of the Athabasca River Barge System must be made by the CCG, in consultation with SHT and Alberta Transportation & Utilities. Barge service for Fort Chipewyan alone should still be possible without CCG services due to the much smaller volumes required.

Project Proposal

During the mid-late 1980's, SHT, CCG, and Indian and Northern Affairs Canada (INAC) performed several studies concerning the Athabasca re-supply problem. Various combinations of all weather roads, winter roads, ATV tote roads and barges were examined. Study recommendations pointed to an all weather road connection as the ultimate solution.

For Saskatchewan communities, this would involve building a road between Points North and Black Lake. The Department of Northern Saskatchewan (DNS) performed office & field studies, and preliminary cost estimates for such a road in the late 1970's as part of an ultimate link to Uranium City. The province did not proceed with this project and DNS was dissolved in 1983.

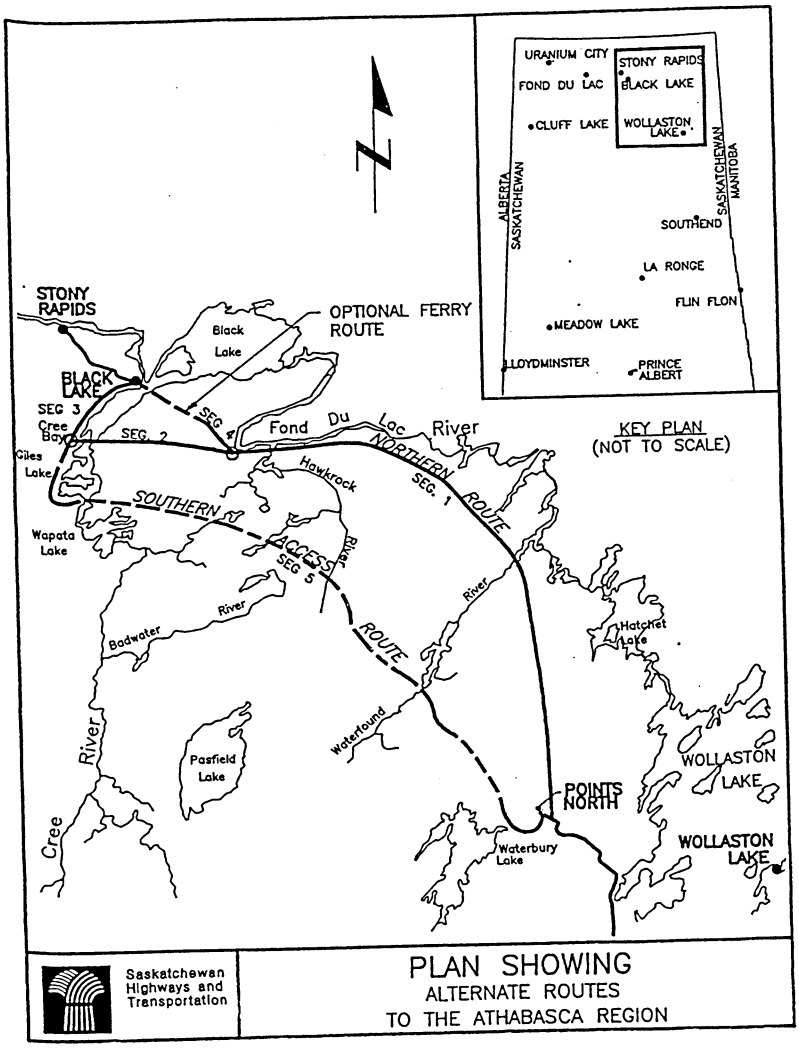
DNS identified the most feasible south and north route corridors with an optional northern route. These 3 routes are shown on the following route map and are referred to as the:

- Southern Access Route (segments 5 + 3, 180 kms)
- Northern Overland Route (segments 1 + 2 + 3, 190 kms)
- Northern Ferry Route (segments 1 + 4, 160 kms)

The Northern Overland Route is generally preferred over the Southern Route because of lower construction costs and the access it provides to scenic, and suspected uranium rich areas along the Fond du Lac River. The Southern Route crosses severely rugged moraine land forms perpendicularly, thus the cost would be considerably higher than the Northern Overland Route, even though it's 10 kilometres shorter. The disadvantage of the north route is that it crosses more environmentally sensitive land. On the other hand, the south route would likely promote far more uranium mining spur road activity to suspected sources along the Fond du Lac River.

The decision between the Northern Overland and Ferry Routes comes down to available capital funding vs. level of service. The ferry route is shorter and less costly, but service would be interrupted in the spring and fall during periods between ice road & ferry services. The more costly Northern Overland Route includes a major bridge over the Cree River and would be operational year-round.

If the final intension was to provide a seasonal gravel or winter road, the Northern Ferry Route would likely be selected due to its lower cost. A staged variation of the Northern Overland Route is the "Cree Bay Route". Stage I would involve road construction between Points North and the east bank of the Cree River. From there, ferry and ice road services would be provided on Black Lake. The cost and level of service for this stage would be similar to that of the Northern Ferry route. Stage II would involve construction of the Cree River Bridge, plus 20 km of road on the west side of Black Lake, and would occur when funds are available.


URANIUM CITY
STONY RAPIDS
FOND DU LAC
BLACK LAKE
CLUFF LAKE
WOLLASTON LAKE
ALBERTA
SASKATCHEWAN
SASKATCHEWAN
MANITOBA
SOUTHEND
LA RONGE
FLIN FLON
MEADOW LAKE
LLOYDMINSTER
PRINCE ALBERT
STONY RAPIDS
OPTIONAL FERRY ROUTE
Black Lake
BLACK LAKE
SEG 3
Cree Bay
SEG. 2
SEG 4
Fond Du Lac River
KEY PLAN
(NOT TO SCALE)
Giles Lake
Hawkrock
NORTHERN
SEG. 1
ROUTE
SOUTHERN
Wapata Lake
ACCESS
SEG 5
River
ROUTE
River
Badwater
River
Hatchet Lake
Waterfound
Pasfield Lake
River
Cree
POINTS NORTH
WOLLASTON LAKE
Waterbury Lake
WOLLASTON LAKE
Saskatchewan Highways and Transportation
PLAN SHOWING
ALTERNATE ROUTES
TO THE ATHABASCA REGION

Rachar

The final route location and design standard could be effected by the level of project funding available. DNS cost estimates were based on a "full standard" engineered road with the following standards:

- 8.0 m top width, 3:1 sideslopes, 1.0 m avg. grade height
- 90 km/hr design speed with local restrictions to 60 km/hr in rough terrain
- stabilized gravel surface

A lower standard "tote" road could be constructed at a much lower cost. A tote road would be built by eye in the field. It would be narrower and closely follow the terrain, thus providing poorer, less safe geometrics.

Fond du Lac and Uranium City would be linked to Stony Rapids by winter road and barge.

Federal-Provincial Cost Share Negotiations

The CCG has indicated a desire to contribute towards capital costs for the proposed road project. This road would enable them to discontinue barge support services on the Athabasca River, contingent on Alberta's consent. INAC also identified a contribution based on potential long term savings in serving First Nation communities. Cost share negotiations between SHT and the two federal agencies were initiated in 1991 and reconvened in 1993.

Project Costs

Project costs consist of: (i) capital construction, and (ii) operation & maintenance (O&M). Personal vehicle road user costs were not considered relevant to this study[3], but freight savings are considered later under benefits.

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[3] Very low anticipated passenger vehicle volume. Cannot compare costs to status quo, where there is no vehicular travel. Passenger vehicle travel cost would be far less than existing air travel cost, but some would still travel by air due to the arduous, time consuming trip.

All routes are approximately equal in this respect. The longest route (Northern Overland) would have better alignment than the south route, and would not involve delays at a ferry crossing.

(i) Construction Costs

For "full standard" road options, cost estimates developed by DNS in 1981 were indexed to 1993$ for bridge (60%), grading (20 to 30%) and engineering work. DNS unit cost estimates assumed construction by government forces with provision for training crews to facilitate northern employment. Separate contingency (risk) factors were added to the estimates for each type of work (i.e. earthwork, clearing) and each segment based on engineering judgement. "Tote road" costs were derived from the above by using 50% of the excavation and gravel stabilization quantities, and reducing engineering costs.

Estimated Capital Project Cost (million 1993$)

	North O'land	South Access	North Ferry	Cree Bay
Full Standard	29.9	34.6	24.2	n.a.
Tote Standard	18.5	n.a.	14.6	15.4

For the purpose of estimating capital cash flow, it was assumed the Environmental Impact Study would start in fiscal year 1 (1994-95) and finish in year 2. Winter road construction would start and finish in year 2 (1995-96). All weather road construction would occur over the next 3 or 6 years respectively for a tote or full standard road.

(ii) O&M Costs

Actual SHT maintenance costs were compiled for comparable northern gravel and winter roads. O&M costs for work in this region are uniquely high due to the location and difficult working conditions. The following O&M values were used:

All-Weather Gravel Roads (any standard)	$3,800/km/yr
Winter Roads	$2,500/km/yr

Total annual O&M cost estimates range from $1.2M to 1.35M/yr once the all weather road is complete. This includes operating costs for a barge to Fond du Lac & Uranium City, and a ferry at Black Lake where required. O&M costs are never ending, and can soon exceed the initial capital investment, especially for a low standard tote road. For a tote road there soon becomes public pressure to upgrade. There is no allowance made, beyond normal maintenance expenditures, for future tote road upgrading.

Benefits

There are many benefits to be realized from the proposed road project. Recipients include the general public, and the federal & provincial governments. Using only the following highly quantifiable benefits, it will be shown that total benefits exceed costs:

(a) Freight Savings (Public, Federal/Provincial Gov'ts)

Estimated freight costs for base goods from origin to destination were compared for the status quo (barge & air) and each road alternative. Some air freight would still be required after road construction due to seasonal access provided for Fond du Lac & Uranium City, and even Black Lake/Stony Rapids under the Northern Ferry and Cree Bay Route options. Conservative annual freight savings estimates range from $0.8M to $1.05M.

Roughly 80% of freight savings would be realized by area residents assuming retailers would pass their savings directly to customers. Provincial & federal agencies (i.e. INAC) would also benefit due to the lower cost of providing services. No estimate has been included for further cost reductions for consumer goods caused by potentially increased retail competition.

Volumes used in freight savings calculations reflect present regional consumption levels. The population of Athabasca communities is growing at a much faster rate than provincial and national averages. Therefore, estimates of future freight savings on base goods are again conservative.

(b) Road Construction/Maintenance Job Creation (Prov & Fed Gov'ts)

Based on labour expenditure estimates and average wages by sector, the person years of created employment was estimated[4]. This employment generates tax revenue and reduces government social assistance payments

[4] Example: For the Southern Access Route, $17.43M (roughly 50%) of road construction cost was in labour. The provincial average annual wage in the "heavy construction" sector is $33,903 (source: "Survey of Employment & Payroll Hours", Statistics Canada, Aug/92, includes overtime pay). This translates into 514 person years of direct construction employment. Government statistics on various forms of social assistance payments and taxation were used to calculate benefits. The same procedure was used for road maintenance, diversion of wholesale trade, and all spin-off benefits.

(SAP)[5]. No benefit was assigned to the federal government for road maintenance employment because there would be a comparable reduction in CCG dredging & navigational aid employment in Alberta. Federal SAP savings are shared between INAC, Health & Welfare Canada (HWC), and Employment & Immigration Canada (EIC).

The considerable public benefit from net wages (gross wages - income tax - reduced SAP) was calculated, but is not included in the total benefits shown later.

(c) Diversion of Wholesale Trade (Provincial Gov't)

Road construction will allow an estimated $2.5 million annual worth of wholesale goods, currently supplied from Alberta, to be supplied from Saskatchewan. The result is direct and indirect jobs creating tax revenue and reducing SAP. The benefit to the Saskatchewan work force and suppliers is not accounted for here.

This benefit was not assigned to the federal government because there would be a corresponding loss of jobs in Alberta. Alberta government losses were not considered in this study. Saskatchewan trucking industry benefits ($400,000/yr gross) would be offset by loss of air freight at Points North.

(d) Spin-off Benefits (Provincial & Federal Gov'ts)

Spin-off benefits from employment created in (b) & (c) above were estimated with the assistance of a computer program developed by Saskatchewan Economic Development.

Road construction and maintenance costs were split into expenditure components such as: wages, fuel, freight, heavy equipment & parts, and manufactured steel, concrete & timber products and entered as input. The value of wholesale goods diverted from Alberta was broken down into various types of dry goods and bulk fuels.

(e) Elimination of CCG Dredging & Navigational Aids

Dredging and navigational aids provided by the CCG are assumed to terminate the year after construction of the winter road. This will save the CCG a reported $0.9M/yr.

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5 It's assumed that 75% of the jobs created will take someone off SAP.

(f) Infrastructure Savings (Provincial Gov't and INAC)

Savings will be realized due to lower costs for government construction and rehabilitation projects. With all weather road access, a conservative 10% saving is assumed for infrastructure projects based on lower material freight cost, and reduced contractor risk and operating cost. A more realistic value may be 25%. Government agencies were surveyed to determine what projects (i.e. hospitals, schools, sewer & water) are on the boards, and ball park project costs.

In addition to the above, there are many benefits which were not, or could not be included in the financial analysis. These include:

- Social benefits of de-isolation
- Job training opportunities
- General improvement in standard of living
- Economic development opportunities, primarily in:

(i) commercial fishing: A small quantity of Lake Trout is backhauled by air to Points North, where it's hauled by truck to Hidden Bay or La Ronge for processing & packing, and then to the Fresh Water Fish Marketing Corporation in Winnipeg. Even with a provincial subsidy, fish prices just cover costs. Substantially lower freight costs will make this operation profitable. It's estimated fish volumes could increase 5 fold, or more.

(ii) tourism: Potential for increased tourism is difficult to estimate. Fly-in outfitters believe business would improve with less costly and time consuming travel.

(iii) mining & exploration: Proven uranium reserves south of Points North are considered sufficient for at least the next 20 years. If and when the road project proceeds, there would likely be immediate exploration activity.

The drawbacks, which must be carefully mitigated, are:

- Effects of cultural changes

- Potential over use of resources (particular concern over caribou migration patterns, establish protected corridor controlled by native groups)

Cost/Benefit Analysis

A net present value (NPV) analysis was performed based on the above costs and benefits. A 25 year study period and 5% annual discount factor (7% interest - 2% inflation) were used.

NPV Cost/Benefit Summary (million 1994$)

Route	Northern Overland		Northern Ferry		Southern Access	Cree Bay
Standard	Full	Tote	Full	Tote	Full	Tote
Costs:						
Capital	25.0	16.5	20.4	13.1	28.9	13.8
O&M	13.8	14.7	14.0	15.0	13.4	15.9
Total Cost	38.8	31.2	34.4	28.1	42.3	29.7
Benefits:						
CCG	11.7	11.7	11.7	11.7	11.7	11.7
INAC	4.8	5.0	4.3	4.6	4.9	4.6
Revenue Canada	3.1	2.1	2.3	1.5	3.8	1.6
EIC/HWC	3.1	2.0	2.3	1.5	3.6	1.6
Total Federal	22.8	20.9	20.6	19.3	24.0	19.5
Provincial	7.0	6.4	6.1	5.6	7.5	5.8
Public (Freight)	10.5	11.8	8.9	9.7	10.6	9.3
Total Benefit	40.2	39.1	35.7	34.6	42.1	34.6
Benefit/Cost Ratio	1.04	1.25	1.04	1.23	1.00	1.16

Comments on Above Table:

1. The above study shows that tangible benefits marginally exceed project costs. When less tangible and intangible benefits are considered, this project appears to be a highly worthwhile initiative.

2. The cost/benefit analysis favours no particular route. The final decision on route location and road standard will be based on available capital funding, and public opinion expressed during the mandatory environmental review process.

3. The tote road standard appears to provide a better benefit/cost ratio. This may be misleading because:

   - Both standards are assumed to have equal O&M costs, but tote road costs could be higher and there would be long term pressure to upgrade.

   - Trucking tariffs were assumed equal for both standards for sections of all weather gravel road. This may not be totally accurate. Total freight savings are in fact estimated higher for the tote road options because the road would be finished earlier.

4. Federal-provincial cost share negotiations have not been successful, even though benefits apparently outweigh costs. There is presently insufficient capital commitment to proceed even with a tote road because:

   - The public benefit is not recoverable
   - Benefitting federal agencies other than INAC & CCG are not offering contributions
   - CCG & INAC insist on using less generous NPV factors to calculate their benefits (10 to 15 years & 7 to 10%)
   - There is no immediate potential for industry cost sharing

Closing Remarks

This is just one example of proposed road access to serve isolated northern First Nation reserve communities. This is a unique case because: (i) there are both First Nation reserve communities and off-reserve residents involved, (ii) there is the added benefit to Saskatchewan of diverting wholesale trade from Alberta, and (iii) the CCG is a recognized benefactor.

The federal government has responsibility for providing transportation services to First Nation reserve communities. The provinces must also recognize their economic benefit from local roadbuilding and maintenance activities. To the best of my knowledge, Manitoba is the only province having a working cost share arrangement with INAC for these roads. There is an urgent need for the federal government to negotiate similar arrangements with other effected provinces.

These projects cannot be justified based solely on government program savings, as has been the approach taken during cost-share negotiations for the Athabasca Road. The public benefit and many intangibles must be weighed. In some cases, opportunities exist to include industry in the partnership. The uranium industry, which has, and is contributing to road development in Northern Saskatchewan, has shown no interest in the Athabasca Road Project because of existing reserves south of Points North.

Considerable savings could have been realized on recent past government projects alone, if this road had been constructed in the early or mid 1980's. These projects include two schools (roughly $12 million each) and sewer & water projects at Fond du Lac & Black Lake. In the near future, a new hospital will likely be built in the Stony Rapids/Black Lake area. This exemplifies the need to act fast.

Acknowledgements

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The following publications were referenced, in addition to various government statistical reports on: taxation, wages, unemployment, social assistance, etc.:

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