ALASKA CANADA RAIL LINK PROJECT FEASIBILITY STUDY REPORT INFRASTRUCTURE COST ESTIMATES FOR FULL RAIL ROUTE INVESTMENT

WORK PACKAGE B3(a)

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1.1 Introduction

The work Packages B1(d), B1(e) and B1(g) identified the technically feasible mainline rail routes in BC and Yukon. For an assumed project traffic of about 10 million revenue tons per year, we have identified other basic infrastructure and ancillary facilities needed, to start and run a railway operation. These include sidings for pass and meet, intermediate and home terminals with buildings and shops, communication and power needed for the dispatching of trains and wayside communication, etc. The main track and support structures have been estimated based on CTA/FRA Class 4 track standards (60 mph freight and 70 mph for passenger) and right-of-way standards compatible with mainline operations, through mountainous terrain, providing a safe and reliable right of way. These standards have been identified in work packages B1(d) and B1(e). The unit prices, developed with the help of other experienced construction engineering personnel reflect the prices one would have to pay in the present marketplace, under the following conditions:

- Railway construction practice (foot print of an operating railway is narrower than a major highway such as the Trans Canada).
- The project is of a major undertaking with nearly 1200 miles of new construction in virgin territory. Economies of scale has been given due consideration.
- Federally regulated railways have the freedom to invite both union and non-union contractors to construct the railway, while meeting certain regulatory obligations.
- The final design and construction practice would respect and recognize restrictions imposed in environmentally sensitive locations.
- All unit prices and cost estimates in this report are in US\$.

1.2 Track and Roadbed Standards

See Work Packages B1(d) and B1(e).

1.3 Unit Prices

The unit prices used in this study represent costs at the time of this study (2005 - 2006) as well as rail industry practice and marketplace. The remoteness of the project location has been addressed through a regional factor, at the final stage of estimating.

The primary purpose of this is to compare the cost of construction and maintenance of the alternate routes.

The selection of premium materials such as premium rails and concrete ties for the track structure are based on the life cycle costs, for moderate to heavy tonnage traffic.

The unit prices include cost of performance bond, liability insurance, mobilization, demobilization, and site clean-up to meet environmental conditions. Allowance for access road construction has been identified in the earthwork and rock excavation unit prices. For construction and estimating purposes, right-of-way widths of 100 feet, 150 feet and 200 feet has been assumed. Land purchase costs are not included in the estimate, as it is assumed that most of the land required for the railway right-of-way would be government or crown land.

Based on the projected railway grade profile and the existing ground profile along the route segments, the terrain encountered was subdivided into the following categories and railway carrying structural units, and prices developed to meet the standards:

- Average construction per mile
- Heavy construction per mile
- Extra heavy construction per mile
- Organics per mile
- Permafrost per mile
- Rock cuts per mile
- Erosion rip rap protection per mile
- Tied back retaining walls average height of 20 feet per foot
- Bridge pipes (multiplate culverts- 6 to 7 feet in diameter) per foot
- Highway grade crossings with flashing lights and bell each
- Highway railway conflict in tight locations per mile
- Bridges over major rivers concrete piers with steel superstructure per foot
- Steel tower bridges on concrete footings over 300 feet high per foot
- Steel tower bridges between 300 and 200 feet high per foot
- Steel tower bridges between 200 and 100 feet high- per foot
- Steel tower bridges between 100 and 50 feet high per foot
- Steel tower bridges less than 50 feet high per foot
- Railway overpass structures per foot
- Highway overpass structures square foot
- Flumes, rock and snow sheds –per foot
- Unlined rock tunnels < 2 miles per foot
- Unlined rock tunnels > 2 < 5 miles per foot
- Unlined rock tunnels > 5 miles per foot
- Mainline track per mile
- 7200 foot long mainline sidings and back tracks every 30 miles per mile
- Communication and power line per mile
- Hot box and dragging equipment detectors every 75 miles each
- Home terminal with facilities every 300 miles each
- Intermediate terminal with facilities every 150 miles each
- Fuelling facilities at one home terminal each

All of the unit prices have been checked against past and present railway construction project prices in BC to ensure they are valid within a reasonable variation.

Notes on Unit Prices:

- Unit prices for earth works, rock works, sub-ballast, and rock rip rap have been derived from recent construction prices in BC and adjusted to reflect the project conditions and marketplace. They have been rounded to the nearest dollar.
- Steel tower bridge unit prices per foot are determined from a step function model assembled and validated over many years from railway bridge construction costs and detailed estimating, by railway bridge engineers. This provides a unit price per foot for different bridge heights, within a reasonable variation, acceptable to this level of study. Bridges estimated for E-85 Cooper Loading.
- The bridges over major rivers were also determined from a similar model, but show a smaller variation in unit prices with height due to greater uncertainty of subsurface and river flow conditions. This model has been used and validated for this cost estimate. Bridges estimated for E-85 Cooper Loading.
- Tunnel unit prices have been developed from five rock tunnel projects constructed on BCR/CN and CP railways in the 1980's. These were further compared to detailed rock tunnel cost estimates completed during the 1980's of 17 rock tunnels in the BC Fraser/Thompson canyon. These prices have been updated to reflect the 2006 marketplace. For rock tunnels over five miles, an allowance has been made for some roof shotcrete, bolting and a ventilation shaft.
- Mainline track, passing tracks, back tracks, R&D tracks, hot box and dragging equipment detectors and grade crossing estimates are compatible with Canadian Class 1 railway unit prices, but adjusted to reflect the marketplace. All prices include material, labour, installation, work equipment, work train, and typical railway overheads for benefits and supervision.

The communication and power unit price and estimate reflect a power and fibre optic cable being buried simultaneously in the railway right-of-way at the end of construction. This would provide a secure and reliable communication system for train operations for the expected traffic levels of this project.

1.4 Route Segment Cost Estimates

At the final stage of estimating, a regional construction factor was applied (one for northern BC of 1.1 and one for Yukon of 1.2) to cover costs related to transport of material, labor, construction camp set up and catering, and general support of project.

Given the quantities developed along each route segment for each of the construction items, total costs were developed by multiplying the unit prices by the estimated quantities. To the total, a contingency of 25% was added to mitigate all of the unknown factors at this stage of this desk top engineering feasibility study. To this total, a 2% environmental mitigation cost was added to mitigate against environmental issues

imposed through regulatory and public hearings. This total was assumed to be the total construction cost of the route segment. A 3% cost was added for preliminary engineering and environmental studies to be conducted prior to application for environmental and regulatory approval. To this was added 3% for owner's overview control costs and 12% for final engineering design and project management during construction of the total project. The construction cost including the engineering, environmental, control and project management costs would be considered to be the total cost of the project and should be used in any business case analysis.

1.5 40 Year Capital Replacement and Right-of-Way Cost Estimate Prediction for Each Route Segment in BC and Yukon

Assumptions used in this cost estimate prediction are:

- 10 MRT (Million Revenue Tons) per year converted to 19 MGT (Million Gross Tons) per year.
- A 3% per year compounded growth in traffic over a 40 year period.
- General rail and track degradation models used by Class 1 freight railroads.
- Life of premium 136lb CWR rail in tangent track under moderately heavy axle loads is about 1 BGT (Billion Gross Tons).
- Right-of-way stabilization costs are based on historical annual costs for railway subdivisions in mountainous terrain.

Table 1: Cost Estimate for Fort Nelson to Watson Lake

In 2006 US\$ converted from	om Cdn\$				Fort Nelson	
at the following exchang	ge rate.			1	o Watson L	_ake
Exchange Rate:	Cdn\$1.00	= US\$0.85		336	Route	Miles
•	BC Sou	th Unit Cost		1.10	BC North	Cost Factor
	Units	US\$/Unit		Quantity	Total Cost -	- Million US
ck - 136# CWR w/ Hardwood or Concrete Ties		·				\$358.143
Track Construction - material & labour	mile	\$969,000		335	\$357.077 M	
bankment Grade & Sub-ballast						\$655.223
Average	mile	\$789,000		137.5	\$119.336 M	
Heavy	mile	\$1,269,000		74.0	\$103.297 M	
Very Heavy	mile	\$3,087,000		50.1	\$170.125 M	
Rock cuts	mile	\$3,454,000		65.3	\$248.101 M	
Organics	mile	\$1,850,000		6.1	\$12.414 M	
Permafrost	mile	\$1,177,000		0.0		
nel Construction						\$74.27
Rock - Unlined < 2 miles each	feet	\$6,800				
Rock - Unlined > 2 miles each	feet	\$6,375		10,560	\$74.052 M	
bankment Protection Structures						\$20.74
Rip Rap Protection - 3 ft wide.	mile	\$936,000		7.62	\$7.846 M	
Tied Back Retaining Walls	feet	\$2,550		1,056	\$2.962 M	
Flumes, Rock/Snow sheds	feet	\$3,400		2,640	\$9.874 M	
lway Bridge Structures Over Water/Debris						\$759.58
Steel Bridges/Trestles						
Less than 50 ft high	feet	\$8,500		3,740	\$34.969 M	
50 to 100 ft high	feet	\$11,050		5,364	\$65.199 M	
100 to 200 ft high	feet	\$12,750		6,890	\$96.632 M	
200 to 300 ft high	feet	\$14,450		656	\$10.427 M	
More than 300 ft high	feet	\$16,150				
Bridge over Major River	feet	\$23,800		19,521	\$511.060 M	
Bridge Pipes (multiplates)	feet	\$1,275		27,835	\$39.039 M	
hway-Railway Intersections						\$4.50
Grade Separation Structures						
Railway Bridge <50'H Over Hwy	feet	\$8,500				
Railway Bridge >50'H Over Hwy	feet	\$11,050				
2-Lane Hwy Bridge Over Rwy	feet	\$9,180		341	\$3.443 M	
4-Lane Hwy Bridge Over Rwy	feet	\$15,300				
Highway/Railway Conflict - Relocation Grade Crossings & Signals	mile No.	\$10,200,000 \$191,250		minor 5	\$1.052 M	
n Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment n Track Construction Cost - Jct to Jct per Compu	· ·		\$5.573 M 0.30%	335.0 Mi 1.0 Mi 336.0 Mi	\$1,866.905 M 5.573 M \$1,872.478 M	
						\$1,872.47
Add Portion of Route on Other Segment Total Route Main Track Costs				336.0 Mi	\$1,872.478 M	
Add Portion of Route on Other Segment Total Route Main Track Costs				336.0 Mi	\$1,872.478 M	\$1,872.47
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors	_	\$404.500				
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power	mile	\$161,500		336	\$59.690 M	\$1,872.47
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors	_	\$161,500 \$204,000				\$1,872.47 \$60.58
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals	mile No.	\$204,000		336 4	\$59.690 M \$0.898 M	\$1,872.47 \$60.58
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks	mile No.	\$204,000		336 4	\$59.690 M \$0.898 M	\$1,872.47 \$60.58
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No. No.	\$204,000 \$3,381,000 \$33,957,000		336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M	\$1,872.47 \$60.58
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M	\$1,872.47 \$60.58
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No.	\$204,000 \$3,381,000 \$33,957,000		336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M	\$1,872.47 \$60.58 \$87.88
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation	Mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M	\$1,872.47
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M	\$1,872.47 \$60.58 \$87.88
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	Mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	encies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M	\$1,872.47 \$60.58 \$87.88 \$2,020.95 \$555.76
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	iencies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M	\$1,872.47 \$60.58 \$87.88 \$2,020.95 \$555.76
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M \$505.239 M \$50.524 M	\$1,872.47 \$60.58 \$87.88 \$2,020.95 \$555.76
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	jencies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M \$505.239 M \$50.524 M	\$1,872.47 \$60.58 \$87.88 \$2,020.95 \$555.76
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	iencies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M \$505.239 M \$50.524 M	\$1,872.47 \$60.58 \$87.88
Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	336 4 10 1	\$59.690 M \$0.898 M \$37.191 M \$37.353 M \$2.805 M \$10.540 M \$505.239 M \$50.524 M	\$1,872.47 \$60.58 \$87.88 \$2,020.95 \$555.76

Table 2: Cost Estimate for Minaret to Watson Lake via Dease Lake

In 2006 US\$ converted from	ction Cost				Minaret	
at the following exchan				1	to Watson I	_ake
Exchange Rate:	Cdn\$1.00	= US\$0.85		392	Route	e Miles
3		th Unit Cost		1.10		Cost Factor
	Units	US\$/Unit		Quantity		- Million US\$
ck - 136# CWR w/ Hardwood or Concrete Ties	-	•			•	\$403.976
Track Construction - material & labour	mile	\$969,000		380	\$405.042 M	
bankment Grade & Sub-ballast						\$1,031.499
Average	mile	\$789,000		7.1	\$6.162 M	
Heavy	mile	\$1,269,000		110.1	\$153.689 M	
Very Heavy	mile	\$3,087,000		150.4	\$510.713 M	
Rock cuts	mile	\$3,454,000		95.5	\$362.843 M	
Organics	mile	\$1,850,000		0.4	\$0.814 M	
Permafrost	mile	\$1,177,000		0.0		
nnel Construction						\$613.015
Rock - Unlined < 2 miles each	feet	\$6,800		7,920	\$59.242 M	
Rock - Unlined > 2 miles each	feet	\$6,375		79,200	\$555.390 M	
bankment Protection Structures						\$446.549
Rip Rap Protection - 3 ft wide.	mile	\$936,000		7.945	\$8.180 M	
Tied Back Retaining Walls	feet	\$2,550		145,860	\$409.137 M	
Flumes, Rock/Snow sheds	feet	\$3,400		8,131	\$30.410 M	
Iway Bridge Structures Over Water/Debris						\$804.914
Steel Bridges/Trestles						
Less than 50 ft high	feet	\$8,500		9,318	\$87.123 M	
50 to 100 ft high	feet	\$11,050		18,865	\$229.304 M	
100 to 200 ft high	feet	\$12,750		16,306	\$228.692 M	
200 to 300 ft high	feet	\$14,450		6,414	\$101.951 M	
More than 300 ft high	feet	\$16,150		2,625	\$46.633 M	
Bridge over Major River	feet	\$23,800		1,969	\$51.548 M	
Bridge Pipes (multiplates)	feet	\$1,275		44,055	\$61.787 M	
hway-Railway Intersections						\$97.362
Grade Separation Structures						
Railway Bridge <50'H Over Hwy	feet	\$8,500		1,450	\$13.558 M	
Railway Bridge >50'H Over Hwy	feet	\$11,050		1,332	\$16.190 M	
2-Lane Hwy Bridge Over Rwy	feet	\$9,180		381	\$3.847 M	
4-Lane Hwy Bridge Over Rwy	feet	\$15,300				
Highway/Railway Conflict - Relocation	mile	\$10,200,000		5.5	\$61.710 M	
Grade Crossings & Signals	No.	\$191,250		11	\$2.314 M	
in Track Construction Cost - Jct to Jct per Manual Dra	awing		\$8.964 M	380.0 Mi	\$3,406.279 M	
·				1 () Mi	-8 964 M	
Mileage Adjustment			-0.26%	-1.0 Mi		
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compu	ıter Drawing			379.0 Mi	\$3,397.315 M	\$3,397.315
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment	ıter Drawing		-0.26% \$5.573 M	379.0 Mi 13.0 Mi	\$3,397.315 M 72.449 M	\$3,397.315 \$72.449
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compu	ıter Drawing			379.0 Mi	\$3,397.315 M	\$3,397.315 \$72.449
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs	ıter Drawing			379.0 Mi 13.0 Mi	\$3,397.315 M 72.449 M	\$3,397.315 \$72.449 \$3,469.764
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors		\$164 E00		379.0 Mi 13.0 Mi 392.0 Mi	\$3,397.315 M 72.449 M \$3,469.764 M	\$3,397.315 \$72.449
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power	mile	\$161,500		379.0 Mi 13.0 Mi 392.0 Mi	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M	\$3,397.315 \$72.449 \$3,469.764
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors		\$161,500 \$204,000		379.0 Mi 13.0 Mi 392.0 Mi	\$3,397.315 M 72.449 M \$3,469.764 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals	mile No.	\$204,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M	\$3,397.315 \$72.449 \$3,469.764
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks	mile No.	\$204,000 \$3,381,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation	Mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies	mile No. No. LS LS LS LS	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	Mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744 \$1,013.030
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS LS	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744 \$1,013.030
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS 25% 27%	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744 \$1,013.030
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Studies	mile No. No. LS LS LS 25% 2%	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M \$920.936 M \$92.094 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744 \$1,013.030
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS 25% 2%	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M \$920.936 M \$92.094 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761 \$143.219 \$3,683.744 \$1,013.030
Mileage Adjustment in Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Studies	mile No. No. LS LS LS 25% 2%	\$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	\$5.573 M	379.0 Mi 13.0 Mi 392.0 Mi 392 5	\$3,397.315 M 72.449 M \$3,469.764 M \$69.639 M \$1.122 M \$44.629 M \$74.705 M \$2.805 M \$21.080 M \$920.936 M \$92.094 M	\$3,397.315 \$72.449 \$3,469.764 \$70.761

Table 3: Cost Estimate for Watson Lake to Carmacks

at the following exchange Rate: WR w/ Hardwood or Concrete Ties instruction - material & labour irade & Sub-ballast Wy s set iction inlined < 2 miles each inlined > 1 miles each inlined > 1 miles each inlined > 2 miles each inlined > 2 miles each inlined > 1 miles each inlined > 2 miles each inlined > 2 miles each inlined > 3 ft wide. Rock/Snow sheds Structures Over Water/Debris in inlined in in	Cdn\$1.00 BC Sou Units mile mile mile mile mile mile mile feet feet feet feet feet feet feet fe	= U\$0.85 th Unit Cost U\$\$/Unit \$969,000 \$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800 \$1,275		403 1.20 Quantity 403 92.8 150.9 101.8 23.4 6.3 27.8 0 0 2,746 4,724 12,434 4,724 2,133	Yukon Co	**Miles** ost Factor - Million US\$ \$468.608 M \$845.001 M \$0.000 M \$19.796 M \$365.894 M
VR w/ Hardwood or Concrete Ties Instruction - material & labour Irade & Sub-ballast Instruction - material & labour Irade & Sub-ballast Instruction Inlined < 2 miles each Inlined > 2 miles each Instructures Irotection Structures Irotection - 3 ft wide. Instructures Over Water/Debris Indiges/Trestles Instructures Over Water/Debris Instructures Instructure	mile mile mile mile mile mile mile mile	th Unit Cost US\$/Unit \$969,000 \$789,000 \$1,269,000 \$3,087,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		1.20 Quantity 403 92.8 150.9 101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	Yukon Co Total Cost - \$468.608 M \$87.863 M \$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	sst Factor • Million US\$ \$468.608 M \$845.001 M \$0.000 M \$19.796 M
Instruction - material & labour Israde & Sub-ballast Invy Selection Inlined < 2 miles each Inlined > 3 ft wide. Is Retaining Walls Rock/Snow sheds Involverse Over Water/Debris Indes/Trestles Indes Structures Indes Structures Indes	mile mile mile mile mile mile mile mile	\$969,000 \$789,000 \$1,269,000 \$3,087,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		Quantity 403 92.8 150.9 101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$468.608 M \$87.863 M \$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$11.204 M \$11.204 M	**Million US\$ \$468.608 M \$845.001 M \$0.000 M \$19.796 M
Instruction - material & labour Israde & Sub-ballast Invy Selection Inlined < 2 miles each Inlined > 3 ft wide. Is Retaining Walls Rock/Snow sheds Involverse Over Water/Debris Indes/Trestles Indes Structures Indes Structures Indes	mile mile mile mile mile mile mile mile	\$969,000 \$789,000 \$1,269,000 \$3,087,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		92.8 150.9 101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$87.863 M \$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$11.204 M \$11.204 M	\$468.608 M \$845.001 M \$0.000 M \$19.796 M
Instruction - material & labour Israde & Sub-ballast Invy Selection Inlined < 2 miles each Inlined > 3 ft wide. Is Retaining Walls Rock/Snow sheds Involverse Over Water/Debris Indes/Trestles Indes Structures Indes Structures Indes	mile mile mile mile mile mile mile mile	\$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		92.8 150.9 101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$87.863 M \$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$845.001 M \$0.000 M \$19.796 M
inst inction included	mile mile mile mile mile mile mile mile	\$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		92.8 150.9 101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$87.863 M \$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$0.000 M \$19.796 M
ist iction Inlined < 2 miles each Inlined > 3 ft wide. Inlined > 4 wide. In	mile mile mile mile mile mile mile mile	\$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		150.9 101.8 23.4 6.3 27.8 0 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$164.875 M \$72.277 M \$36.986 M	\$0.000 M \$19.796 M
sst section Inlined < 2 miles each Inlined > 2 miles each Inlined > 2 miles each Indication Structures Indication - 3 ft wide. Indication - 3 ft wide	mile mile mile mile mile mile mile mile	\$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		150.9 101.8 23.4 6.3 27.8 0 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$229.791 M \$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
sst section Inlined < 2 miles each Inlined > 2 miles each Inlined > 2 miles each Indication Structures Indication - 3 ft wide. Indication - 3 ft wide	mile mile mile mile mile mile feet feet feet feet feet feet feet fe	\$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		101.8 23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$377.108 M \$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
sst section Inlined < 2 miles each Inlined > 2 miles each Inlined > 2 miles each Indication Structures Indication - 3 ft wide. Indication - 3 ft wide	mile mile mile mile feet feet feet feet feet feet feet f	\$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		23.4 6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$96.988 M \$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
ist iction Illined < 2 miles each Inlined > 2 miles each Inlined 2 miles each Inlined 3 miles Inlined 4 miles Inlined 5 miles Inlined	mile mile feet feet mile feet feet feet feet feet feet feet fe	\$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$112,750 \$14,450 \$16,150 \$23,800		6.3 27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$13.986 M \$39.265 M \$8.592 M \$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
st st stoction Inlined < 2 miles each sold miles each sold miles = 2 miles each sold miles each each sold miles each each each each each each each each	mile feet feet feet feet feet feet feet fe	\$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$14,450 \$16,150 \$23,800		27.8 0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$8.592 M \$11.204 M \$1164.875 M \$72.277 M \$36.986 M	\$19.796 M
Inction Inlined < 2 miles each Inlined > 3 ft wide. Inlined > 4 miles In	feet feet feet feet feet feet feet feet	\$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		0 0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$8.592 M \$11.204 M \$148.185 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
nlined < 2 miles each nlined > 2 miles each rotection Structures Protection - 3 ft wide. k Retaining Walls Rock/Snow sheds Structures Over Water/Debris dges/Trestles ass than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections apparation Structures ailway Bridge <50'H Over Hwy	feet mile feet feet feet feet feet feet feet fe	\$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$19.796 M
nlined > 2 miles each rotection Structures Protection - 3 ft wide. k Retaining Walls Rock/Snow sheds Structures Over Water/Debris dges/Trestles less than 50 ft high 10 to 100 ft high 10 to 200 ft high 10 to 300 ft high 10 re than 300 ft high 10 re wall over Major River pes (multiplates) 10 ay Intersections 11 ayaration Structures 12 ailway Bridge <50'H Over Hwy	feet mile feet feet feet feet feet feet feet fe	\$6,375 \$936,000 \$2,550 \$3,400 \$11,050 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		0 7.65 0 2,746 4,724 12,434 4,724 2,133	\$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	·
rotection Structures Protection - 3 ft wide. k Retaining Walls Rock/Snow sheds Structures Over Water/Debris diges/Trestles less than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$936,000 \$2,550 \$3,400 \$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		7.65 0 2,746 4,724 12,434 4,724 2,133	\$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	·
Protection - 3 ft wide. k Retaining Walls Rock/Snow sheds Structures Over Water/Debris diges/Trestles less than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections leparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$2,550 \$3,400 \$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		0 2,746 4,724 12,434 4,724 2,133	\$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	·
k Retaining Walls Rock/Snow sheds Structures Over Water/Debris dges/Trestles less than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections leparation Structures lealway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$2,550 \$3,400 \$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		0 2,746 4,724 12,434 4,724 2,133	\$11.204 M \$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$365.894 M
Rock/Snow sheds Structures Over Water/Debris dges/Trestles less than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections leparation Structures lealway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		2,746 4,724 12,434 4,724 2,133	\$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$365.894 M
Structures Over Water/Debris dges/Trestles less than 50 ft high to 100 ft high to 100 to 300 ft high to to 300 ft high ore than 300 ft high lidge over Major River loss (multiplates) lay Intersections leparation Structures lealway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$8,500 \$11,050 \$12,750 \$14,450 \$16,150 \$23,800		4,724 12,434 4,724 2,133	\$48.185 M \$164.875 M \$72.277 M \$36.986 M	\$365.894 M
dges/Trestles ess than 50 ft high 0 to 100 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$11,050 \$12,750 \$14,450 \$16,150 \$23,800		12,434 4,724 2,133	\$164.875 M \$72.277 M \$36.986 M	ఫ ად 3 .894 М
ass than 50 ft high 0 to 100 ft high 10 to 200 ft high 10 to 300 f	feet feet feet feet feet feet feet feet	\$11,050 \$12,750 \$14,450 \$16,150 \$23,800		12,434 4,724 2,133	\$164.875 M \$72.277 M \$36.986 M	
0 to 100 ft high 00 to 200 ft high 00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections aparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet feet feet feet feet	\$11,050 \$12,750 \$14,450 \$16,150 \$23,800		12,434 4,724 2,133	\$164.875 M \$72.277 M \$36.986 M	
00 to 200 ft high 00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet feet feet	\$12,750 \$14,450 \$16,150 \$23,800		4,724 2,133	\$72.277 M \$36.986 M	
00 to 300 ft high ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet feet feet	\$14,450 \$16,150 \$23,800		2,133	\$36.986 M	
ore than 300 ft high ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet feet	\$16,150 \$23,800				
ridge over Major River pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet feet	\$23,800		28,478	\$43.571 M	
pes (multiplates) ay Intersections eparation Structures ailway Bridge <50'H Over Hwy	feet			28,478	\$43.571 M	
ay Intersections eparation Structures ailway Bridge <50'H Over Hwy		\$1,275		28,478	\$43.571 IVI	
eparation Structures ailway Bridge <50'H Over Hwy						COEO COA M
ailway Bridge <50'H Over Hwy	f					\$259.684 M
		¢0 500		984	¢10.027.M	
aliway bildde >50 ft Ovel ftwy	feet	\$8,500		904	\$10.037 M	
Lane Hwy Bridge Over Rwy	feet	\$11,050 \$9,180		433	\$4.770 M	
Lane Hwy Bridge Over Rwy Lane Hwy Bridge Over Rwy	feet	\$15,300		433	\$4.770 IVI	
Railway Conflict - Relocation	mile	\$10,200,000		19.5	\$238.680 M	
rossings & Signals	No.	\$191,250		27	\$6.197 M	
USSITIGS & Signals	INO.	\$191,230		21	φ0.197 W	
struction Cost - Jct to Jct per Manual Dra	wing		\$4.861 M	403.0 Mi	\$1,958.983 M	
	wiiig				. ,	included above
	ter Drawing		0.0070			\$1,958.983 M
	ter brawing			400.0 IVII	ψ1,930.903 W	Ψ1,330.300 Ν1
				403 0 Mi	\$1 958 983 M	\$1.958.983 M
Star Noute Main Track Costs				403.0 WII	ψ1,930.903 W	ψ1,330.303 W
ns. Power. & Detectors						\$79.325 M
	mile	\$161 500		403	\$78 101 M	7. 0.020 M
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	110.	ψ=0-7,000			ψ1.22 7 1	\$156.240 M
	No	\$3.381 000		12	\$48.686 M	+ · - • · - · • · · · · · · · · · · · · ·
erminal & facilities						
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milar a radinado		ψο,σοΣ,σσσ			ψ 22.007 W	
nstruction Costs					•	\$2,194.548 M
						\$603.501 M
	25%				\$548 637 M	*************************************
		Costs + Contino	rencies			
ub Total	-/-		,		+= [\$2,798.049 M
						\$503.648 M
	3%				\$83 941 M	7550.0-10 IVI
.aooa. olday a rippioval						
wner Overview Costs	12%				\$335.766 M	
wner Overview Costs	12/0				\$555.1 00 W	\$3,301.697 M
wner Overview Costs ngineering & Project Mgnt ted Route Cost						
n: o o n iii & ri sirin n o o n iii k	rtion of Route on Other Segment tal Route Main Track Costs s, Power, & Detectors cation & power Dragging Equipment Detectors minals idings & back tracks minal & facilities eling facilities ninal & facilities estruction Costs cies & Environmental Mitigation intingencies vironmental Mitigation b Total ing & Environmental Studies g. Environmental Study & Approval	struction Cost - Jct to Jct per Computer Drawing rition of Route on Other Segment tal Route Main Track Costs s, Power, & Detectors cation & power mile Dragging Equipment Detectors ridings & back tracks No. riminal & facilities LS eling facilities LS minal & facilities Acides general Mitigation 2% b Total ing & Environmental Studies general Study & Approval 3%	struction Cost - Jct to Jct per Computer Drawing Intion of Route on Other Segment Ital Route Main Track Costs s, Power, & Detectors cation & power mile \$161,500 Dragging Equipment Detectors No. \$204,000 Minals Gidings & back tracks No. \$3,381,000 Minial & facilities LS \$33,957,000 Minial & facilities LS \$2,550,000 Minial & facilities LS \$9,582,000 Minial & facilities Section Costs Minial & Environmental Mitigation Minimial & Mitigation 2% Minimial & Costs + Conting Minimial & Mitigation 3% Minimial & Environmental Studies Minimial & Minimial	struction Cost - Jct to Jct per Computer Drawing intion of Route on Other Segment tal Route Main Track Costs s, Power, & Detectors cation & power Dragging Equipment Detectors No. \$204,000 minals didings & back tracks No. \$3,381,000 minal & facilities LS \$33,957,000 eling facilities LS \$2,550,000 minal & facilities LS \$9,582,000 Instruction Costs cies & Environmental Mitigation witingencies Vironmental Mitigation 2% Costs + Contingencies b Total ing & Environmental Studies g. Environmental Studies	struction Cost - Jct to Jct per Computer Drawing rition of Route on Other Segment tal Route Main Track Costs s, Power, & Detectors cation & power mile \$161,500 403 Dragging Equipment Detectors No. \$204,000 5 minals cidings & back tracks No. \$3,381,000 12 minal & facilities LS \$33,957,000 2 eling facilities LS \$2,550,000 1 minal & facilities LS \$9,582,000 2 struction Costs cies & Environmental Mitigation untingencies 25% vironmental Mitigation 2% Costs + Contingencies b Total ing & Environmental Studies g. Environmental Study & Approval 3%	Augustication Cost - Jct to Jct per Computer Drawing

Table 4: Cost Estimate for Carmacks to Alaska Border at Ladue River

mile mile mile mile mile feet feet feet feet feet feet feet fe	= US\$0.85 th Unit Cost US\$/Unit \$969,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500 \$11,050		223 1.20 Quantity 223.5 79.6 39.5 83.0 10.6 10.8 0.0 48.46 4,224	Yukon Co	e Miles ost Factor - Million US\$ \$259.305 M \$509.749 M
mile mile mile mile mile mile mile mile	\$789,000 \$789,000 \$1,269,000 \$1,269,000 \$1,177,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		1.20 Quantity 223.5 79.6 39.5 83.0 10.6 10.8 0.0	Yukon Co Total Cost - \$259.886 M \$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	ost Factor - Million US\$ \$259.305 M \$509.749 M \$0.000 M
mile mile mile mile mile mile mile mile	\$789,000 \$789,000 \$1,269,000 \$1,269,000 \$1,177,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		Quantity 223.5 79.6 39.5 83.0 10.6 10.8 0.0 0 0 48.46	\$259.886 M \$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	- Million US\$ \$259.305 N \$509.749 N \$0.000 N
mile mile mile mile mile mile mile mile	\$969,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400		223.5 79.6 39.5 83.0 10.6 10.8 0.0 48.46	\$259.886 M \$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	\$259.305 M \$509.749 M \$0.000 M
mile mile mile mile mile mile mile mile	\$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400		79.6 39.5 83.0 10.6 10.8 0.0	\$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	\$509.749 M
mile mile mile mile mile mile mile mile	\$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400		79.6 39.5 83.0 10.6 10.8 0.0	\$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	\$0.000 M
mile mile mile mile mile mile mile mile	\$789,000 \$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400		79.6 39.5 83.0 10.6 10.8 0.0	\$75.365 M \$60.151 M \$307.465 M \$43.935 M \$23.976 M	\$0.000 M
mile mile mile mile mile mile feet feet feet feet feet feet	\$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400		39.5 83.0 10.6 10.8 0.0 0 48.46	\$60.151 M \$307.465 M \$43.935 M \$23.976 M	\$0.000 M
mile mile mile mile mile feet feet feet feet feet feet	\$1,269,000 \$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,375 \$936,000 \$2,550 \$3,400		39.5 83.0 10.6 10.8 0.0 0 48.46	\$60.151 M \$307.465 M \$43.935 M \$23.976 M	
mile mile mile feet feet feet feet feet feet feet	\$3,087,000 \$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		83.0 10.6 10.8 0.0 0 48.46	\$307.465 M \$43.935 M \$23.976 M	·
mile mile feet feet mile feet feet feet feet	\$3,454,000 \$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		10.8 0.0 0 0 48.46	\$43.935 M \$23.976 M \$54.430 M	·
mile feet feet mile feet feet feet feet	\$1,850,000 \$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		0.0 0 0 48.46	\$23.976 M \$54.430 M	·
feet feet mile feet feet feet feet	\$1,177,000 \$6,800 \$6,375 \$936,000 \$2,550 \$3,400 \$8,500		0 0 48.46	\$54.430 M	
mile feet feet feet feet feet	\$6,375 \$936,000 \$2,550 \$3,400 \$8,500		48.46		·
mile feet feet feet feet feet	\$6,375 \$936,000 \$2,550 \$3,400 \$8,500		48.46		\$71.504 M
mile feet feet feet feet	\$936,000 \$2,550 \$3,400 \$8,500		48.46		\$71.504 M
feet feet feet feet	\$2,550 \$3,400 \$8,500				\$71.504 M
feet feet feet feet	\$2,550 \$3,400 \$8,500				
feet feet feet	\$3,400 \$8,500		4,224	\$17.234 M	
feet feet	\$8,500		4,224	\$17.234 M	
feet					
feet					\$372.555 M
feet					
	\$11.050		14,009	\$142.892 M	
feet	\$11,000		821	\$10.886 M	
	\$12,750				
feet	\$14,450				
feet	\$16,150				
feet	\$23,800		6,791	\$193.951 M	
feet	\$1,275		16,772	\$25.661 M	
					\$2.314 M
feet	\$8,500				
feet					
feet			148	\$1.630 M	
feet					
	\$10,200,000				
No.	\$191,250		3	\$0.689 M	
ng				. ,	
		-0.22%			included above
r Drawing			223.0 Mi	\$1,215.426 M	\$1,215.427 M
			000 0 14:	01.015.100.11	*4.045.407.14
			223.0 MI	\$1,215.426 M	\$1,215.427 M
					\$40.0E4.N
mile	\$164 F00		222	¢42.047.84	\$43.951 M
					
INU.	φ∠∪4,∪∪∪		<u>3</u>	φυ./ 34 ۱۷Ι	\$79.649 M
No	\$3 391 000		6	¢24 343 M	\$79.049 W
LO	\$9,302,000		ı	\$11.430 W	
					\$1,339.027 M
					\$368.233 M
25%				\$224 757 M	ψ300.233 IV
	Costs + Conting	encies			
2 /0	Costs + Conting	encies		φ33.47 0 IVI	\$1,707.260 N
					\$1,707.260 N \$307.307 N
20/				ΦΕ4 04 0 M	\$307.307 IV
12%				\$∠U4.8/1 M	
				-	\$2,014.567 N
	feet feet feet feet	feet \$1,275 feet \$8,500 feet \$11,050 feet \$9,180 feet \$15,300 mile \$10,200,000 No. \$191,250 The proving \$10,200,000 No. \$204,000 No. \$3,381,000 LS \$33,957,000 LS \$2,550,000 LS \$9,582,000 25% 2% Costs + Conting 3% 3% 3%	feet \$1,275 feet \$8,500 feet \$11,050 feet \$9,180 feet \$15,300 mile \$10,200,000 No. \$191,250 The provided by	feet \$1,275 16,772 feet \$8,500 feet \$11,050 feet \$9,180 feet \$15,300 mile \$10,200,000 No. \$191,250 3 **Drawing** Drawing** **Drawing** **Dr	feet \$1,275 16,772 \$25.661 M feet \$8,500

Table 5: Cost Estimate for Carmacks to Beaver Creek via Nisling River

	tion Cost om Cdn\$			t	Carmack o Beaver C	_
at the following exchang		LICES OF				
Exchange Rate:	Cdn\$1.00	= US\$0.85 h Unit Cost		233 1.20		e Miles ost Factor
	Units	US\$/Unit		Quantity		· Million US\$
Frack - 136# CWR w/ Hardwood or Concrete Ties	Ullits	03\$/0111t		Quantity	Total Cost	\$263.645 M
		# 000 000		0404	4050 00714	\$203.045 IVI
Track Construction - material & labour	mile	\$969,000		218.1	\$253.607 M	\$200.257 M
Embankment Grade & Sub-ballast	mile	\$789,000		70.0	\$72.809 M	\$389.357 M
Average Heavy	mile mile	\$1,269,000		76.9 46.9	\$72.809 M \$71.419 M	
Very Heavy	mile	\$3,087,000		26.8	\$99.278 M	
Rock cuts	mile	\$3,454,000		1.0	\$4.145 M	
Organics	mile	\$1,850,000		55.5	\$123.210 M	
Permafrost	mile	\$1,177,000		2.6	\$3.672 M	
Tunnel Construction	IIIIC	ψ1,177,000		2.0	ψ5.07 Σ 101	\$529.111 M
Rock - Unlined < 2 miles each	feet	\$6,800				4020 1111111
Rock - > 5 miles each	feet	\$9,563		44,352	\$508.966 M	
Embankment Protection Structures		ψ0,000		,002	φοσοίσσο	\$14.150 M
Rip Rap Protection - 3 ft wide.	mile	\$936,000		1.09	\$1.224 M	,
Tied Back Retaining Walls	feet	\$2,550		528	\$1.616 M	
Flumes, Rock/Snow sheds	feet	\$3,400		2,640	\$10.771 M	
Railway Bridge Structures Over Water/Debris				,		\$395.229 M
Steel Bridges/Trestles						
Less than 50 ft high	feet	\$8,500		5,659	\$57.722 M	
50 to 100 ft high	feet	\$11,050		1,804	\$23.921 M	
100 to 200 ft high	feet	\$12,750				
200 to 300 ft high	feet	\$14,450				
More than 300 ft high	feet	\$16,150				
Bridge over Major River	feet	\$23,800		9,925	\$283.458 M	
Bridge Pipes (multiplates)	feet	\$1,275		9,856	\$15.080 M	
lighway-Railway Intersections			,			\$0.716 M
Grade Separation Structures						
Railway Bridge <50'H Over Hwy	feet	\$8,500				
Railway Bridge >50'H Over Hwy	feet	\$11,050				
2-Lane Hwy Bridge Over Rwy	feet	\$9,180				
4-Lane Hwy Bridge Over Rwy	feet	\$15,300				
Highway/Railway Conflict - Relocation	mile	\$10,200,000			00.000.14	
				3	\$0.689 M	
Grade Crossings & Signals	No.	\$191,250				
<u> </u>		ψ191,200	\$7.204 M		\$1 521 597 M	
Main Track Construction Cost - Jct to Jct per Manual Dra		ψ191,200 J	\$7.304 M	209.7 Mi	\$1,531.587 M	included above
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment	awing	<u> </u>	\$7.304 M 3.96%	209.7 Mi 8.3 Mi	60.623 M	
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu	awing	ψ191,230 <u>]</u>	3.96%	209.7 Mi 8.3 Mi 218.0 Mi	60.623 M \$1,592.210 M	\$1,592.208 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment	awing	ψ131,230 j	•	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi	60.623 M \$1,592.210 M 86.415 M	\$1,592.208 M \$86.415 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu	awing	Ψ131,230 <u>)</u>	3.96%	209.7 Mi 8.3 Mi 218.0 Mi	60.623 M \$1,592.210 M	\$1,592.208 M \$86.415 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment	awing	Ψ131,230 <u>)</u>	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi	60.623 M \$1,592.210 M 86.415 M	\$1,592.208 M \$86.415 M \$1,678.623 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs	awing		3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M	\$1,592.208 M \$86.415 M \$1,678.623 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs	wing iter Drawing	\$161,500 \$204,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi	60.623 M \$1,592.210 M 86.415 M	\$1,592.208 M \$86.415 M \$1,678.623 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power	wing ter Drawing mile	\$161,500	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M	included above \$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors	wing ter Drawing mile	\$161,500	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals	wing Iter Drawing mile No.	\$161,500 \$204,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks	mile No.	\$161,500 \$204,000 \$3,381,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$161,500 \$204,000 \$3,381,000 \$33,957,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M \$83.706 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M	\$1,592.208 N \$86.415 N \$1,678.623 N \$45.889 N \$83.706 N
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000	3.96%	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M	\$1,592.208 N \$86.415 N \$1,678.623 N \$45.889 N \$83.706 N
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	mile No. No. LS LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M \$83.706 M \$1,808.218 M \$497.260 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Contingencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	\$1,592.210 M \$6.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M	\$1,592.208 N \$86.415 N \$1,678.623 N \$45.889 N \$83.706 N \$1,808.218 N \$497.260 N
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Fotal Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS 25% 22%	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	60.623 M \$1,592.210 M 86.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M \$452.055 M \$45.205 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M \$83.706 M \$1,808.218 M \$497.260 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Fotal Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	\$1,592.210 M \$6.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M \$452.055 M \$45.205 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M \$83.706 M \$1,808.218 M \$497.260 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Fotal Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS 25% 2%	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	\$1,592.210 M \$6.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M \$45.205 M \$69.164 M \$69.164 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compu Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Fotal Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$161,500 \$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	3.96% \$5.761 M	209.7 Mi 8.3 Mi 218.0 Mi 15.0 Mi 233.0 Mi 233.3 3	\$1,592.210 M \$6.415 M \$1,678.625 M \$45.155 M \$0.734 M \$28.400 M \$40.748 M \$3.060 M \$11.498 M \$452.055 M \$45.205 M	\$1,592.208 M \$86.415 M \$1,678.623 M \$45.889 M \$83.706 M \$1,808.218 M \$497.260 M

Table 6: Cost Estimate for Watson Lake to Whitehorse via Alaska Highway

In 2006 US\$ converted from	ction Cost om Cdn\$				Watson La	
at the following exchan					to Whiteho	rse
Exchange Rate:	Cdn\$1.00	= US\$0.85		314	Route	e Miles
<u> </u>	BC Sou	th Unit Cost		1.20	Yukon C	ost Factor
	Units	US\$/Unit		Quantity		- Million US\$
Track - 136# CWR w/ Hardwood or Concrete Ties	•			-	•	\$365.120 M
Track Construction - material & labour	mile	\$969,000		312	\$362.794 M	
Embankment Grade & Sub-ballast						\$647.071 M
Average	mile	\$789,000		42.7	\$40.428 M	
Heavy	mile	\$1,269,000		170.5	\$259.637 M	
Very Heavy	mile	\$3,087,000		78.2	\$289.684 M	
Rock cuts	mile	\$3,454,000		4.3	\$17.823 M	
Organics	mile	\$1,850,000		15.3	\$33.966 M	
Permafrost	mile	\$1,177,000		1.0	\$1.412 M	
Tunnel Construction					1	\$0.000 M
Rock - Unlined < 2 miles each	feet	\$6,800		0		
Rock - Unlined > 2 miles each	feet	\$6,375		0		
Embankment Protection Structures						\$15.825 M
Rip Rap Protection - 3 ft wide.	mile	\$936,000		0.285	\$0.320 M	
Tied Back Retaining Walls	feet	\$2,550		4,330	\$13.250 M	
Flumes, Rock/Snow sheds	feet	\$3,400		528	\$2.154 M	A070 400 B
Railway Bridge Structures Over Water/Debris					1	\$376.429 M
Steel Bridges/Trestles		#0.500		0.000	#400 00F M	
Less than 50 ft high	feet	\$8,500		9,826	\$100.225 M	
50 to 100 ft high	feet	\$11,050		3,757	\$49.818 M	
100 to 200 ft high	feet	\$12,750		2,789	\$42.672 M	
200 to 300 ft high	feet	\$14,450				
More than 300 ft high	feet	\$16,150		F F77	\$450.070.M	
Bridge over Major River	feet	\$23,800		5,577	\$159.279 M	
Bridge Pipes (multiplates)	feet	\$1,275		14,403	\$22.037 M	C242 400 M
Highway-Railway Intersections						\$243.108 M
Grade Separation Structures	foot	ФО 500		205	#2.000.M	
Railway Bridge <50'H Over Hwy	feet feet	\$8,500		295	\$3.009 M	
Railway Bridge >50'H Over Hwy 2-Lane Hwy Bridge Over Rwy	feet	\$11,050 \$9,180		148	\$1.630 M	
4-Lane Hwy Bridge Over Rwy	feet	\$15,300		140	\$1.030 IVI	
Highway/Railway Conflict - Relocation	mile	\$10,200,000		19.0	\$232.560 M	
Grade Crossings & Signals	No.	\$10,200,000		19.0	\$4.361 M	
Oracle Orossings & Olymais	140.	ψ191,230		13	ψ4.501 W	
Main Track Construction Cost - Jct to Jct per Manual Dra	awina		\$5.247 M	312.0 Mi	\$1,637.059 M	
Mileage Adjustment	g		0.64%	2.0 Mi	. ,	included above
Main Track Construction Cost - Jct to Jct per Compu	ıter Drawing		0.0.70	314.0 Mi	\$1,647.553 M	\$1,647.553 M
Add Portion of Route on Other Segment				• • • • • • • • • • • • • • • • • • • •	ψ.,σσσσ	4 1,0 11 1000 111
Total Route Main Track Costs				314.0 Mi	\$1,647.553 M	\$1,647.553 M
					* 1,0 11 1000 111	* 1,0 11 10 00 11.
						\$61.832 M
Communications, Power, & Detectors					\$60.952 M	
	mile	\$161,500		314	1 200.003 IVI	
Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors	mile No.	\$161,500 \$204,000		314 4	\$60.853 M \$0.979 M	
Communication & power Hot Box & Dragging Equipment Detectors						\$91.821 M
Communication & power						\$91.821 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals	No.	\$204,000		4	\$0.979 M	\$91.821 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks	No.	\$204,000		9	\$0.979 M \$36.515 M	\$91.821 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities	No. No. LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		9	\$0.979 M \$36.515 M \$40.748 M	\$91.821 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000		9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M	\$91.821 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M	
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs	No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M	\$1,801.206 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M	\$1,801.206 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation	No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M	\$1,801.206 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies	No. No. LS LS LS 25%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M	\$1,801.206 N \$495.332 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	No. No. LS LS LS 25%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M	\$1,801.206 N \$495.332 N \$2,296.538 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	No. No. LS LS LS 25%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M	\$1,801.206 N \$495.332 N \$2,296.538 N
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M \$450.302 M \$45.030 M	\$1,801.206 M \$495.332 M \$2,296.538 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M \$450.302 M \$45.030 M	\$91.821 M \$1,801.206 M \$495.332 M \$2,296.538 M \$413.377 M
Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval Owner Overview Costs	No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	9 1 1	\$0.979 M \$36.515 M \$40.748 M \$3.060 M \$11.498 M \$450.302 M \$45.030 M	\$1,801.206 N \$495.332 N \$2,296.538 N

Table 7: Cost Estimate for Whitehorse to Beaver Creek via Alaska Highway

In 2006 US\$ converted from	ction Cost om Cdn\$				Whitehor	
at the following exchan	-			t	o Beaver C	reek
Exchange Rate:	Cdn\$1.00	= US\$0.85		328	Route	e Miles
	BC Sou	uth Unit Cost		1.20	Yukon C	ost Factor
	Units	US\$/Unit		Quantity	Total Cost	- Million US\$
Track - 136# CWR w/ Hardwood or Concrete Ties						\$381.398 M
Track Construction - material & labour	mile	\$969,000		325.5	\$378.491 M	
Embankment Grade & Sub-ballast				20.4	00474414	\$659.188 M
Average	mile	\$789,000		26.1	\$24.711 M	
Heavy Very Heavy	mile mile	\$1,269,000 \$3,087,000		166.2 69.2	\$253.089 M \$256.344 M	
Rock cuts	mile	\$3,454,000		5.3	\$230.344 M	
Organics	mile	\$1,850,000		24.0	\$53.280 M	
Permafrost	mile	\$1,177,000		31.7	\$44.773 M	
Tunnel Construction		ψ1,111,000		01.1		\$123.463 M
Rock - Unlined < 2 miles each	feet	\$6,800		2,640	\$21.542 M	
Rock - Unlined > 2 miles each	feet	\$6,375		13,200	\$100.980 M	
Embankment Protection Structures		, , , , , , ,				\$26.917 M
Rip Rap Protection - 3 ft wide.	mile	\$936,000		0		
Tied Back Retaining Walls	feet	\$2,550		0		
Flumes, Rock/Snow sheds	feet	\$3,400		6,547	\$26.712 M	
Railway Bridge Structures Over Water/Debris						\$688.905 M
Steel Bridges/Trestles						
Less than 50 ft high	feet	\$8,500		26,345	\$268.719 M	
50 to 100 ft high	feet	\$11,050		2,871	\$38.069 M	
100 to 200 ft high	feet	\$12,750		6,070	\$92.871 M	
200 to 300 ft high	feet	\$14,450		1,476	\$25.594 M	
More than 300 ft high	feet	\$16,150				
Bridge over Major River	feet	\$23,800		7,546	\$215.514 M	
Bridge Pipes (multiplates)	feet	\$1,275		28,031	\$42.887 M	
Highway-Railway Intersections						\$9.884 M
Grade Separation Structures		#0.500		000	00.040.14	
Railway Bridge <50'H Over Hwy	feet	\$8,500		328	\$3.346 M	
Railway Bridge >50'H Over Hwy 2-Lane Hwy Bridge Over Rwy	feet	\$11,050 \$9,180		295	\$3.250 M	
4-Lane Hwy Bridge Over Rwy	feet	\$15,300		290	\$3.230 IVI	
Highway/Railway Conflict - Relocation	mile	\$10,200,000				
Grade Crossings & Signals	No.	\$191,250		14	\$3.213 M	
Crado Crocolligo a Ciglialo		ψ101,200			ψο.Σ το πτ	l
Main Track Construction Cost Latte Let nor Married De			\$5.761 M	325.5 Mi	\$1,875.352 M	•
iviain Track Construction Cost - Jet to Jet der Manual Dr	awina					
Main Track Construction Cost - Jct to Jct per Manual Dra Mileage Adjustment	awing		0.77%	2.5 Mi	14.403 M	included above
	· ·				14.403 M \$1,889.755 M	
Mileage Adjustment	· ·			2.5 Mi		
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt	· ·			2.5 Mi		\$1,889.755 M
Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs	· ·			2.5 Mi 328.0 Mi	\$1,889.755 M	\$1,889.755 M \$1,889.755 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Computation of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors	uter Drawing			2.5 Mi 328.0 Mi 328.0 Mi	\$1,889.755 M \$1,889.755 M	\$1,889.755 M \$1,889.755 M \$1,889.755 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Computadd Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power	uter Drawing	\$161,500		2.5 Mi 328.0 Mi 328.0 Mi	\$1,889.755 M \$1,889.755 M \$63.566 M	\$1,889.755 M \$1,889.755 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors	uter Drawing	\$161,500 \$204,000		2.5 Mi 328.0 Mi 328.0 Mi	\$1,889.755 M \$1,889.755 M	\$1,889.755 M \$1,889.755 M \$64.545 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Computed Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals	mile No.	\$204,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M	\$1,889.755 M \$1,889.755 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks	mile No.	\$204,000 \$3,381,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M	\$1,889.755 M \$1,889.755 M \$64.545 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M	\$1,889.755 M \$1,889.755 M \$64.545 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M	\$1,889.755 M \$1,889.755 M \$64.545 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compt Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M	\$1,889.755 M \$1,889.755 M \$64.545 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compted Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs	mile No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation	mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies	mile No. No. LS LS LS 25%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M \$2,050.178 M \$563.799 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS 25%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M \$2,050.178 M \$563.799 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M \$512.545 M \$51.254 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M \$2,050.178 M \$563.799 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M \$512.545 M \$51.254 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M \$2,050.178 M \$563.799 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M \$512.545 M \$51.254 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M
Mileage Adjustment Main Track Construction Cost - Jct to Jct per Compte Add Portion of Route on Other Segment Total Route Main Track Costs Communications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Sidings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities Total Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Eng. Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	0.77%	2.5 Mi 328.0 Mi 328.0 Mi 328.0 Mi 328 4	\$1,889.755 M \$1,889.755 M \$63.566 M \$0.979 M \$40.572 M \$40.748 M \$3.060 M \$11.498 M \$512.545 M \$51.254 M	\$1,889.755 M \$1,889.755 M \$64.545 M \$95.878 M \$2,050.178 M \$563.799 M

Table 8: Cost Estimate for Mackenzie to Watson Lake Along Rocky Mountain Trench

In 2006 US\$ converted for				l to	MacKenz Watson L	
at the following exchar	_					
Exchange Rate:	Cdn\$1.00	= US\$0.85		435		Miles
		h Unit Cost		1.10		Cost Factor
ck - 136# CWR w/ Hardwood or Concrete Ties	Units	US\$/Unit		Quantity	i otai Cost -	Million US\$
Track Construction - material & labour	mile	\$969,000		435	\$463.667 M	\$463.667
bankment Grade & Sub-ballast	mile	\$909,000		433	\$403.007 IVI	\$923.310
Average						φ 3 23.310
Heavy						
Very Heavy Rock cuts		 				
Organics						
Permafrost						
nel Construction						\$0.000
Rock - Unlined < 2 miles each						φυ.υυ
Rock - Unlined < 2 miles each						
bankment Protection Structures						\$184.662
						\$104.002
Rip Rap Protection - 3 ft wide.						
Tied Back Retaining Walls						
Flumes, Rock/Snow sheds way Bridge Structures Over Water/Debris						\$315.654
Steel Bridges/Trestles		1				⊅ 313.054
· ·						
Less than 50 ft high						
50 to 100 ft high						
100 to 200 ft high						
200 to 300 ft high						
More than 300 ft high						
Bridge over Major River						
Bridge Pipes (multiplates)						****
hway-Railway Intersections						\$31.565
Grade Separation Structures						
Railway Bridge <50'H Over Hwy						
Railway Bridge >50'H Over Hwy						
2-Lane Hwy Bridge Over Rwy						
4-Lane Hwy Bridge Over Rwy						
Highway/Railway Conflict - Relocation						
Grade Crossings & Signals						
n Track Construction Cost - Jct to Jct per Manual Di	rawing			435.0 Mi		
Mileage Adjustment	· ·		4 411 M	-		\$1 918 858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp	· ·		4.411 M	435.0 Mi		\$1,918.858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment	· ·		4.411 M	435.0 Mi		
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp	· ·		4.411 M	-		\$1,918.858 \$1,918.858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs	· ·		4.411 M	435.0 Mi		\$1,918.858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs	outer Drawing	\$204 000	4.411 M	435.0 Mi	\$97 614 M	\$1,918.858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power	outer Drawing	\$204,000 \$204,000	4.411 M	435.0 Mi 435.0 Mi	\$97.614 M \$1.346 M	\$1,918.858
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors	outer Drawing	\$204,000 \$204,000	4.411 M	435.0 Mi	\$97.614 M \$1.346 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals	mile No.	\$204,000	4.411 M	435.0 Mi 435.0 Mi 435	\$1.346 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks	mile No.	\$204,000 \$3,381,000	4.411 M	435.0 Mi 435.0 Mi 435 6	\$1.346 M \$52.067 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000	4.411 M	435.0 Mi 435.0 Mi 435 6	\$1.346 M \$52.067 M \$74.705 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.411 M	435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M	
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No.	\$204,000 \$3,381,000 \$33,957,000	4.411 M	435.0 Mi 435.0 Mi 435 6	\$1.346 M \$52.067 M \$74.705 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.411 M	435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M	\$1,918.858 \$98.960 \$150.657
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.411 M	435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M	\$1,918.858 \$98.960 \$150.657
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation	mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.411 M	435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M	\$1,918.858 \$98.960 \$150.657
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M	\$1,918.858 \$98.960
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs mmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.334
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.331
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$54.212 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.331
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$54.212 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.331
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS 25% 2% 3% 3%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$542.12 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.334
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs Engineering & Project Mgnt	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$54.212 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.331 \$2,764.806 \$497.665
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS 25% 2% 3% 3%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$542.12 M	\$1,918.856 \$98.966 \$150.657 \$2,168.475 \$596.33 \$2,764.806 \$497.665
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs Engineering & Project Mgnt	mile No. No. LS LS LS 25% 2% 3% 3%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		435.0 Mi 435.0 Mi 435 6 14 2 1	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$542.12 M	\$1,918.858 \$98.960 \$150.657 \$2,168.475 \$596.331 \$2,764.806 \$497.665
Mileage Adjustment In Track Construction Cost - Jct to Jct per Comp Add Portion of Route on Other Segment Total Route Main Track Costs Inmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors Ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs Engineering & Project Mgnt tal Estimated Route Cost	mile No. No. LS LS LS 25% 2% 3% 3%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000	encies	435.0 Mi 435.0 Mi 435 6	\$1.346 M \$52.067 M \$74.705 M \$2.805 M \$21.080 M \$542.119 M \$54.212 M \$82.944 M \$82.944 M \$331.777 M	\$1,918.858 \$98.960 \$150.657 \$2,168.479 \$596.331 \$2,764.806 \$497.665

Table 9: Cost Estimate for Hazelton to Watson Lake via Dease Lake

·	om Cdn\$			to	Hazeltor Watson L	-
at the following exchan	ge rate.				Watson E	ano
Exchange Rate:	Cdn\$1.00	= US\$0.85		497		Miles
	BC South	Unit Cost		1.10		Cost Factor
	Units	US\$/Unit		Quantity	Total Cost -	Million US\$
ck - 136# CWR w/ Hardwood or Concrete Ties						\$529.752
Track Construction - material & labour	mile	\$969,000		497	\$529.752 M	
bankment Grade & Sub-ballast						\$1,229.552
Average						
Heavy						
Very Heavy						
Rock cuts						
Organics						
Permafrost						
nel Construction						\$0.000
Rock - Unlined < 2 miles each						
Rock - Unlined > 2 miles each						
bankment Protection Structures					"	\$245.910
Rip Rap Protection - 3 ft wide.						
Tied Back Retaining Walls						
Flumes, Rock/Snow sheds						
way Bridge Structures Over Water/Debris						\$318.912
Steel Bridges/Trestles						Ţ
Less than 50 ft high	_					
50 to 100 ft high						
100 to 200 ft high						
200 to 300 ft high						
More than 300 ft high						
Bridge over Major River						
Bridge Over Major River Bridge Pipes (multiplates)						
hway-Railway Intersections						\$31.89
Grade Separation Structures						φ31.03
Railway Bridge <50'H Over Hwy						
Railway Bridge <50'H Over Hwy						
2-Lane Hwy Bridge Over Rwy						
4-Lane Hwy Bridge Over Rwy Highway/Railway Conflict - Relocation	-					
Grade Crossings & Signals						
n Track Construction Cost - Jct to Jct per Manual Dr	_		4.740.14	497.0 Mi		
Mileage Adjustment n Track Construction Cost - Jct to Jct per Comp	uter Drawing		4.740 M	497.0 Mi		\$2,356.017
	uter Drawing		4.740 M	497.0 Mi 497.0 Mi		
n Track Construction Cost - Jct to Jct per Compi Add Portion of Route on Other Segment Total Route Main Track Costs	uter Drawing		4.740 M			\$2,356.017
n Track Construction Cost - Jct to Jct per Compi Add Portion of Route on Other Segment Total Route Main Track Costs		\$204 000	4.740 M	497.0 Mi	\$111.527 M	\$2,356.017 \$2,356.017 \$113.098
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power	mile	\$204,000 \$204,000	4.740 M		\$111.527 M \$1.571 M	\$2,356.017
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors		\$204,000 \$204,000	4.740 M	497.0 Mi	\$111.527 M \$1.571 M	\$2,356.017 \$113.09
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals	mile No.	\$204,000	4.740 M	497.0 Mi 497 7	\$1.571 M	\$2,356.017 \$113.09
n Track Construction Cost - Jct to Jct per Compr Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks	mile No.	\$204,000 \$3,381,000	4.740 M	497.0 Mi 497 7	\$1.571 M \$59.506 M	\$2,356.017 \$113.09
n Track Construction Cost - Jct to Jct per Compr Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No. No.	\$204,000 \$3,381,000 \$33,957,000	4.740 M	497.0 Mi 497 7 16 2	\$1.571 M \$59.506 M \$74.705 M	\$2,356.017 \$113.09
n Track Construction Cost - Jct to Jct per Compr Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.740 M	497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M	\$2,356.017 \$113.098
n Track Construction Cost - Jct to Jct per Compr Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities	mile No. No.	\$204,000 \$3,381,000 \$33,957,000	4.740 M	497.0 Mi 497 7 16 2	\$1.571 M \$59.506 M \$74.705 M	\$2,356.01 \$113.09
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.740 M	497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M	\$2,356.017 \$113.099 \$158.099
n Track Construction Cost - Jct to Jct per Composition Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities	mile No. No. LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.740 M	497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M	\$2,356.01 \$113.09 \$158.09 \$2,627.21
n Track Construction Cost - Jct to Jct per Compression Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation	mile No. No. LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000	4.740 M	497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M	\$2,356.017 \$113.096 \$158.096 \$2,627.217
n Track Construction Cost - Jct to Jct per Compression Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M	\$2,356.017 \$113.098 \$158.096 \$2,627.217
n Track Construction Cost - Jct to Jct per Compression Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M	\$2,356.01 \$113.09 \$158.09 \$2,627.21 \$722.48
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total	mile No. No. LS LS LS LS	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M	\$2,356.017 \$113.096 \$158.096 \$2,627.217 \$722.485 \$3,349.696
n Track Construction Cost - Jct to Jct per Compound Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies	mile No. No. LS LS LS 25% 2%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M \$656.803 M \$65.680 M	\$2,356.017 \$113.096 \$158.096 \$2,627.217 \$722.485 \$3,349.696
n Track Construction Cost - Jct to Jct per Compe Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval	mile No. No. LS LS LS LS 25% 2% (\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M \$656.803 M \$65.680 M	\$2,356.017 \$113.096 \$158.096 \$2,627.217 \$722.485 \$3,349.696
n Track Construction Cost - Jct to Jct per Compression Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval Owner Overview Costs	mile No. No. LS LS LS LS 3% 3% 3%	\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M \$656.803 M \$65.680 M \$100.491 M \$100.491 M	\$2,356.017 \$113.096 \$158.096 \$2,627.217 \$722.485 \$3,349.696
n Track Construction Cost - Jct to Jct per Compe Add Portion of Route on Other Segment Total Route Main Track Costs nmunications, Power, & Detectors Communication & power Hot Box & Dragging Equipment Detectors ings and Terminals Mainline sidings & back tracks Home Terminal & facilities Fueling facilities Inter. Terminal & facilities al Route Construction Costs Contigencies & Environmental Mitigation Contingencies Environmental Mitigation Sub Total Engineering & Environmental Studies Environmental Study & Approval	mile No. No. LS LS LS LS 25% 2% (\$204,000 \$3,381,000 \$33,957,000 \$2,550,000 \$9,582,000		497.0 Mi 497 7 16 2 1	\$1.571 M \$59.506 M \$74.705 M \$2.805 M \$21.080 M \$656.803 M \$65.680 M	\$2,356.017

Grading & Struture Costs from Previous CN Study converted to 2006 US\$

Table 10: Cost Comparison and Engineering Properties of Route Segments

Alaska	Canada Railw	vay Alternate	Route Asses	sment Summa	ary - Yukon	& BC Segmer	nts		e Routes in BC Study
Corridor Description Issues	Watson Lake to	Carmacks to Alaska Border via Yukon & Ladue R.	Carmacks to Beaver Creek via Nisling River	Watson Lake to Whitehorse along Alaska Hwy.	Whitehorse to Beaver Creek along Alaska Hwy.	Fort Nelson to Watson Lake	Minaret to Watson Lake via (BCR grade)	MacKenzie to Watson Lake via Rocky Mountain trench Route	Hazelton to Watson Lake via Nass, Klappen River,& Dease Lake.
Construction Miles	403	223	233	314	328	336	392	435	497
Tunnels	None	None	8.4 miles	2.2 miles	0.5 mile	None	16.5 miles	None	None
Highway conflict	High	Low	Low	Very high	Moderate	Moderate	Moderate	Low	Moderate
Profile Grades									
General Grade	Low	Low	Steep	Low	Moderate	Moderate	Very Steep	Gentle	Moderate
Max. Grade	0.7% EB & WB	0.7% EB & WB	1.5%WB 0.7% EB	0.7% EB & WB	1.0% EB & WB	0.7% WB 1.0% EB	2.5% EB & WB	0.5% EB & WB	1.0% EB & WB
Alignment Curves	•								
1 to 3 deg. Curves	88 miles - 22 %	48 miles - 22%	37 miles - 16%	74 miles - 24%	55 miles - 17%	32 miles - 10%	90 miles - 23%	89 miles - 20 %	118 miles - 24%
4 to 6 deg. Curves	24 miles - 6%	29 miles - 13%	15 miles - 6%	31 miles - 10%	13 miles - 4%	79 miles - 24%	57 miles - 15%	21 miles - 5%	55 miles - 11%
All Curves	112 miles - 28%	77 miles - 35%	52 miles - 22 %	105 miles - 34%	68 miles - 21%	111 miles - 33%	147 miles - 38%	110 miles - 25%	174* miles - 35%
Track/Train Dynamics Ou	tcome								
Rail Wear	Low	Moderate	Low	Moderate	Low	Very High	High	Low	Moderate
Fuel Consumption	Low	Low	High	Low	Moderate	Moderate	Very High	Low	Moderate
Operating Cost	Low	Low	High	Medium	Medium	Medium	Very High	Low	Medium
Risk Ranking									
Seismic Activity	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low
Nat. Disasters	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate
Capital Construction Cos	ts								
Total (Million \$)	\$3,301.70	\$2,014.57	\$2,720.46	\$2,709.92	\$3,084.49	\$3,040.53	\$5,542.19	\$3,262.47	\$3,952.64
Per Mile (Million \$)	\$8.19	\$9.03	\$11.68	\$8.63	\$9.40	\$9.05	\$14.14	\$7.50	\$7.95

^{*} Revised June 2, 2006

Table 11: Cost Comparison of Full Rail Routes from Alaska to BC

ALCAN Rail Link - Route Cost Estimates

In Million US\$

	Route Segment	Rail oute	Delta Jct Ladue Border Carmacks Watson Lake Fort Nelson	Delta Jct Beaver Creek Carmacks Watson Lake Fort Nelson	Delta Jct Beaver Creek Whitehorse Watson Lake Fort Nelson	Delta Jct Ladue Border Carmacks Watson Lake MacKenzie	Delta Jct Beaver Creek Carmacks Watson Lake MacKenzie	Delta Jct Beaver Creek Whitehorse Watson Lake MacKenzie	Delta Jct Ladue Border Carmacks Watson Lake Hazelton	Delta Jct Beaver Creek Carmacks Watson Lake Hazelton	Delta Jct Beaver Creek Whitehorse Watson Lake Hazelton
1.	Delta Jct to Ladue Borde	-	\$1,047.65			\$1,047.65			\$1,047.65		
1.	Delta Jct to Beaver Cree	-		\$1,169.02	\$1,169.02		\$1,169.02	\$1,169.02		\$1,169.02	\$1,169.02
	Ladue Border Carmacks		\$2,014.57			\$2,014.57			\$2,014.57		
	Beaver Creek Carmacks			\$2,720.46			\$2,720.46			\$2,720.46	
	Beaver Creek Whitehorse				\$3,084.49			\$3,084.49			\$3,084.49
	Carmacks t Watson Lak	-	\$3,301.70	\$3,301.70		\$3,301.70	\$3,301.70		\$3,301.70	\$3,301.70	
	Whitehorse Watson Lak				\$2,709.92			\$2,709.92			\$2,709.92
	Watson Lake Fort Nelsor		\$3,040.53	\$3,040.53	\$3,040.53						
	Watson Lake MacKenzie					\$3,262.47	\$3,262.47	\$3,262.47			
	Watson Lake Hazelton	to							\$3,952.64	\$3,952.64	\$3,952.64
	Total Route Cost	е	\$9,404.44	\$10,231.71	\$10,003.96	\$9,626.39	\$10,453.65	\$10,225.90	\$10,316.55	\$11,143.82	\$10,916.07
	Total Route Miles	е	1,162	1,182	1,188	1,261	1,281	1,287	1,323	1,343	1,349
	Cost per Mi	le	\$8.09	\$8.66	\$8.42	\$7.63	\$8.16	\$7.95	\$7.80	\$8.30	\$8.09
2.	3rd Party Cap. Cost		\$816.17	\$816.17	\$816.17	\$52.28	\$52.28	\$52.28	\$0.00	\$0.00	\$0.00
3.	Miles to Pr. George	,	1,678	1,698	1,704	1,377	1,397	1,403	1,613	1,633	1,639
3.	Miles to Pr. Rupert	<u> </u>	2,139	2,159	2,165	1,838	1,858	1,864	1,494	1,514	1,520

Notes:

- 1. Costs from Alaska Consultants
- 2. CN costs to upgrade to Class 3 or 4 track
- 3. From Delta Junction Alaska

Table 12: Capital and Right-of-Way Costs Over 40 Years for Each Route Segment Estimated Capital replacement & ROW costs over 40 year life for Rail Route segments in BC & Yukon

Assume 10 MRT converted to 19 MGT per route segment

Assume 3% growth in traffic each year over a forty year period

Route Description	Fort Nelson to Watson Lake	Minaret to Watson Lake	Watson Lake to Carmacks	Carmacks to Ladue border	Carmacks to Beaver Creek	Watson Lake to Whitehorse	Whitehorse to Beaver Creek
Plant Summary							
Route Miles	336	392	403	223	233	314	328
Rail Replacement - 40 yr	537	634	433	283	292	385	340
Route Curve Miles	33.10%	37.60%	27.90%	34.60%	22.20%	33.40%	20.60%
Very heavy -Miles	50.10	150.40	101.80	83.00	26.80	78.20	69.20
Miles of Rock Cut	65.30	95.50	23.40	10.60	1.00	4.30	5.30
Miles of Rip Rap	7.62	79.40	7.65	48.46	1.09	0.28	0.00
No. of Turnouts	24	36	34	18	20	24	26
Grade Xings	5	11	27	3	3	19	14
Miles of Rock Tunnel	2	17	0	0	8.4	0	3.0
Maximum Grade	1.0%	2.5%	0.7%	0.7%	1.5%	0.7%	1.0%

Capital Cost Items	Costs						
Rail replacement	\$206,745,000	\$244,090,000	\$181,692,000	\$118,860,000	\$122,640,000	\$161,637,000	\$142,758,000
Tie replacement	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Track surfacing	\$104,522,880	\$121,943,360	\$136,762,080	\$75,677,280	\$79,070,880	\$106,559,040	\$111,310,080
Undercut & Ballast	\$130,653,600	\$152,429,200	\$170,952,600	\$94,596,600	\$98,838,600	\$133,198,800	\$139,137,600
Rail profile grinding	\$18,431,179	\$24,718,832	\$13,653,064	\$11,076,484	\$7,332,891	\$14,540,433	\$7,920,595
Bridge/Deck replacement	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Slope/rock stabilisation	\$68,818,933	\$155,906,667	\$81,352,000	\$67,657,600	\$17,966,400	\$52,844,800	\$47,680,000
Rehab. Turnouts	\$7,465,920	\$11,198,880	\$11,538,240	\$6,108,480	\$6,787,200	\$8,144,640	\$8,823,360
Rehab. Grade Xings	\$110,000	\$242,000	\$648,000	\$72,000	\$72,000	\$456,000	\$336,000
Total	\$536,747,512	\$710,528,938	\$596,597,984	\$374,048,444	\$332,707,971	\$477,380,713	\$457,965,635
Cost/MGT/mile/year	\$1,130	\$1,282	\$1,047	\$1,186	\$1,010	\$1,075	\$987

Alternate BC Routes Not included in this Study						
Mackenzie to Watson Lake	Hazelton to Watson Lake					
435	497 **					
22.70%	32.40%					
Costs	Costs					

Costs		Costs	
\$607,362,960)	\$755,599,410	*:
\$987	*	\$1,075	*

Note:

Replacement costs estimated using rail & track degredation models & ROW costs estimated useing historical costs for mountionous terrain.

^{*} Assumed

^{**} Revised June 2, 2006

1.6 Comments on Cost Estimate of Selected Route Segments and Total Route

- Cost estimates of the route segments represent only one alignment projected, to meet the location engineering standards as agreed to in the meeting of November 2005. Refinement to the selected route has not been done, due to lack of time and also being outside the scope of the term of reference.
- Based on past feasibility railway location studies, the initial projected alignment could be realigned and refined with the help of more detailed mapping, aerial photos interpretation, and field validation, to reduce the costs and still meeting the locations and engineering standards. This may tend to lengthen the railway in order to mitigate major obstacles of impediments, but overall could achieve a reduction of about 5% to 10% in the total construction cost.
- Of the seven route segments studied in BC and Yukon, the cost of six segments fall within a range of \$8.19 to \$11.68 million per mile, with an average of \$9.33 million per mile. The segment from Minaret to Watson Lake via Dease Lake cost estimate is \$14.14 million per mile.
- The alternate route segments studied in 1969 were Mackenzie (near Prince George) to Watson Lake and Hazelton via Dease Lake to Watson Lake. The standards were reviewed and construction costs re-estimated in 2006 dollars. The construction costs are \$7.5 and \$7.95 million per mile, respectively. The original estimates were adjusted using construction cost index and allowance to reflect the standards of this study as compared to 1969.
- The construction cost of the segment from Minaret to Watson Lake appears to be very high as compared to the other route segments. The maximum ruling grade is 2.5% and is outside the limits of the standards set in this study. This results in very high fuel consumption and long-term operating costs. Based on this present information, it is recommended that this segment should be excluded from the ALCAN Railway Corridor Study. However, this segment at the projected location could be constructed to a much lower branch line track and right-of-way standards at a substantial lower cost, to meet any local traffic demands.
- Based on the engineering properties (grade profile, ground profile, and alignment) of the route, difficulty of construction, capital construction cost per mile, and future capital and maintenance cost, our ranking by priority is as follows:
 - 1. Ranking No.1 Route from Mackenzie, BC via Sifton Pass to Watson Lake, Carmacks, Ladue River Alaska border and to Delta Junction, Alaska. This route is most promising for traffic destined to central and southern USA.

- 2. Ranking No.2 Route from Hazelton BC, via Dease Lake to Watson Lake, Carmacks, Ladue River Alaska border and to Delta Jct., Alaska. This route is the shortest to west coast tidewater ports and most attractive for traffic destined to the far east, eliminating nearly 600 operating miles.
- 3. Ranking No.3 Route from Mackenzie BC via Sifton Pass to Watson Lake, Whitehorse, Beaver Creek, and to Delta Jct., Alaska, along the Alaskan Highway.
- 4. Ranking No.4 Route from Hazelton BC, via Dease Lake to Watson Lake, Whitehorse, Beaver creek, and to Delta Jct., Alaska, along the Alaskan Highway.

The remaining routes are ranked lower and could be constructed to mainline standards, with some revisions in grade and alignment. Market forces should drive the route selection process.