

REPORT TO THE PUBLIC WORKS DEPARTMENT OF BRITISH COLUMBIA
ON RECONNAISSANCE SURVEY ON PORTION OF BRITISH COLUMBIA -
YUKON - ALASKA HIGHWAY BETWEEN MANSON RIVER, NEAR FINLAY
FORKS AND SIFTON PASS, B.C.

By J.M.Rolston

Finlay Forks, B.C.

Situated at the intersection of the 124th meridian with the 56° parallel of latitude, at an elevation of 1920 feet above sea level, the Finlay river flowing south-easterly meets the Parsnip river flowing north-westerly, together forming the Peace river. The Manson river from the west also joins at this point.

The valleys of these three rivers form a basin drained by the Peace river which breaks through the Rocky mountains at this point to the east.

The valleys of the Parsnip and Finlay rivers occupy the Rocky Mountain trench.

Finlay river

The Finlay river, rising in the Coast Range, flows easterly and enters the Rocky mountain trench at Fort Ware, where it joins the White river from the east. From Fort Ware to Finlay Forks, a distance of 130 miles, the Finlay river occupies, with its bends and high water channels a strip about one mile wide - bordered on each side by benches gradually sloping upward to the base of the mountains forming the Rocky mountain trench.

The tributary streams (with the exception of the Inginika) joining the Finlay river in this section, are all glacial streams subject to violent freshets. In consequence the junction of these streams with the Finlay river are spread out into various channels choked by log jams. In fact, the channels of Finlay river and all its tributaries are subject to change at each high water; the silty banks caving in and causing the timber to form fresh jams. Bridging will therefore be one of the principal items of the estimate of cost.

Alternative Routes

The Rocky Mountain trench between Finlay Forks and Fort Ware is about six miles wide, with the Finlay river and its channels occupying the centre of the valley. It was at once apparent that both sides had to be closely examined to determine which side would form the better location for a road.

Method of Reconnaissance

In order to report on both sides of the valley, and obtain as far as possible quick and reliable information to be used as a cost basis, cross sections from known points on the Finlay River were taken about every three miles from the river to the higher benches. Objective points such as river crossings were determined and tied in by observation or measurements. This method was carried out between Finlay Forks and Fort Ware.

Fox River

From Fort Ware northerly the Rocky Mountain trench is occupied by the Fox river, rising in Sifton Pass, and joining the Finlay river at Fort Ware. Through this section, some forty miles in length, the valley is narrower, and the location could more easily be determined by running a traverse of the existing pack trail, tied in to known points, determined by triangulation.

Projected Location

From the information obtained a plan, one mile to the inch is attached, showing the position of what I consider the best location for a road on both the east and west sides of the Finlay river to Sifton Pass. Mileage is shown every five miles.

Commencement of Survey

The zero of the projected locations is near mile 46 north of the 55° parallel on the surveyed 124th meridian, on the northerly bank of the Manson river. From this point it is about twenty miles westerly up the Manson river to the constructed road to Fort St James. At mile 12 on the projected location, the routes to the east and west sides of Finlay river diverge. A description and estimate of cost of each route is as follows:

East Side Finlay River

- Mile 0 - 12 High gravel ridges, covered with jackpines and spruce.
- Mile 12 - 20 Gravel ridges sloping towards Manson river, which is crossed at mile 20. Heavy clearing in river bottom lands.
- Mile 20 - 27 Follows gravel ridge bordering south side of Manson river, Finlay river crossing at mile 27. This point of crossing is the only one available, where the Finlay is in one channel. The width of river at this point, 1000 feet. Considerable protection work to banks will be necessary.

Peace River

- Road Junction After crossing Finlay river to the north side, a proposed route along the north bank of the Peace river leads to the road system of Peace river.
- Mile 27 - 44 The higher benches should be followed which afford light construction for several miles. At mile 44 the Ospika river (from the east) would be crossed. This river is a very swift glacial stream with innumerable channels near its junction with the Finlay. The bridge site is some three miles upstream. Considerable protection work will be required to the banks to avoid undermining at high water.
- Mile 44 - 56 Through spruce and jackpine flats mostly clay loam. In all spruce flats on the Finlay river considerable soft ground is met with, which will require corduroy foundation. Spruce flats generally border muskegs which will have to be avoided in location. Deadman's river is crossed at mile 56.
- Mile 56 - 80 Dry gravel flats, mostly jackpines with occasional small creek crossings. Bridges will be required at Collins, Deer, Davis, and Shovel Creeks, but will not be expensive construction.
- Fort Grahame At mile 80 Fort Grahame is reached. This Hudson's Bay Company post was established in 1890 as an outpost to Fort

St James. The post supplies and trades with about fifty Indians and a few white trappers. Trails from Fort Connolly on Bear Lake to Fort Nelson cross the Finlay at Fort Grahame. The trail of 1898 also joins the Finlay Valley here. At present Fort Grahame is a regular point of call for the air mail from Prince George.

Mile 80-107 In this five-mile section the Finlay river follows at the base of the mountain slopes on the east bank. At mile 110 Deserter's Canyon is half a mile long, and the Finlay river goes through a narrow gorge about 150 feet wide, with one hundred foot rock walls. The fall is about 18 feet and a run through the canyon in our fast river boats is an experience well worth having. This point would form one of the principal attractions for tourists on the route.

The location should follow close to the Finlay river, Mile 107 to 109, then grade up to get above the Canyon walls on a rocky bench. This section will have considerable rock work.

Mile 112-120 North of Deserter's Canyon the east side of the valley widens out again, and construction costs to the Akie river would be very slightly higher than those below the canyon. The location would follow the rim of a high bench which borders a big muskeg. At mile 113 Wedge Creek is crossed, requiring a hundred foot bridge and approaches. At mile 119 the Akie river is a formidable obstacle. Surveys were made here, and the only suitable crossing point found some distance up stream. This is a very swift glacial stream covering a large area with its various high water channels. Considerable approach and protection work will be required.

Mile 120-143 From the Akie river to Paul Creek at mile 143, good jack-pine flats and spruce flats can be obtained. No serious bridges are required. Some carduroy will be required across spruce

flats. At mile 143 Paul Creek is crossed close to its junction with the Finlay river. A 50-foot bridge will be required.

Mile 143-157 $\frac{1}{2}$ The nature of the valley changes again at Paul Creek, and from this point to White river the Finlay river is at the base of high rocky side hills. The cost in this twelve miles will be heavy, to allow for considerable rock and corduroying work. At mile 155 the White river can be crossed in a canyon. A 300-foot bridge and approaches required. At mile 157 $\frac{1}{2}$ the east route joins the west route at Fort Ware.

Fort Ware

Fort Ware, like Finlay Forks, is situated at the junction of the Fox river and White river with the Finlay river.

This is a Hudson's Bay Company outpost supplying and trading with about one hundred Indians and a few white trappers. The Finlay river enters the Rocky Mountain trench at this point while the White river, one of the largest tributaries of the Finlay, flows from the east. The Rocky Mountain trench with its wide valley carries on northwesterly over Sifton Pass, but is occupied by the Fox river from Fort Ware to Sifton Pass. A pack trail leads from Fort Ware to Telegraph Creek.

Estimate of Cost:

As a means of getting a comparative estimate of cost of the two routes, the following specifications were used.

Specifications:

Roadbed cuts 24' wide	Culverts - pipe
" fills 22' wide	Surface - gravel
" surface 20' wide	Bridges - steel and concrete
Clearing 66' wide	Bridges (small) - pile and frame.
Grubbing 20' wide	

Estimates of Cost:

Using specifications as shown, and quantities obtained from sample miles at various points, costs have been classified as follows:

Light construction, \$10,000 per mile
 Medium " \$15,000 " "
 Heavy " \$25,000 " "

The above estimates do not include bridges of 50' and over, but include all small bridges and culverts.

C l a s s i f i c a t i o n
Grading Surfacing Bridging
Manson River Mile 0 - - to Mile 157.5 Fort Ware

<u>Mile</u>	<u>Grading, Surfacing and culverts (miles)</u>			<u>Concrete and Steel Bridges Length of opening (feet)</u>						<u>Remarks</u>	
	<u>Light</u>	<u>Medium</u>	<u>Heavy</u>	<u>50</u>	<u>100</u>	<u>150</u>	<u>200</u>	<u>300</u>	<u>400</u>		<u>1000</u>
0 - 12		12									
12 - 20		7	1			1					Bridge over Manson river
20 - 27		7									
27 - 28			1								1 Bridge, Finlay river
28 - 30	2										
30 - 33		3									
33 - 36		2	1	1							
36 - 40	3	1									
40 - 45	2	2	1					1			Bridge over Ospika river
45 - 50		5									
50 - 55	2	3		1	1						
55 - 60	2	3			1						
60 - 66	6										
66 - 70	2	1	1	1							
70 - 71			1		1						
71 - 76	4	1									
76 - 85		7	2	2	1						
85 - 90		4	1	2							
90 - 100	6	3	1	2							
100-107	5	1	1	1							
107-114	2	1	4		2						
114-120	3	2	1					1			Bridge over Akie river
120-130	7	1	2	3							
130-145	10	2	3		1						
145-157 $\frac{1}{2}$	2.5	2	8					1			Bridge over White river
Totals:	58.5	70	29	13	7	1		3		1	

58.5 miles of light construction at \$10,000 per mile	\$	585,000
70 " " medium " " 15,000 " "		1,050,000
29 " " heavy " " 25,000 " "		725,000
13 Bridges 50 feet long " 10,000		130,000
7 " 100 " " " 30,000		210,000
1 " 150 " " " 50,000		50,000
3 " 300 " " " 100,000		300,000
1 " 1000 " " " 500,000		500,000
		<hr/>
Cost East side on 157.5 miles - Manson River to Fort Ware, \$3,550,000.		3,550,000

Route on West side of Finlay River

Manson River to Fort Ware

- Mile 0 - 30 The route selected follows close to the surveyed line of the 124th meridian. There are several long moraines which can be used, giving an excellent location at about 2300 feet. Omineca river can only be crossed cheaply at Black Canyon, about three miles above its junction with the Finlay river. Below the canyon the Omineca breaks up into many high water channels. A 150 foot bridge would be required.
- Mile 30-42 On high gravel and clay ridges which extend to the crossing of Cache Creek. The clearing would be heavy in places, and considerable corduroy would be required. There is a belt of good spruce available in this section. Cache Creek is a sluggish beaver stream which parallels the Finlay for about ten miles.
- Mile 42-60 The location should follow gravel ridges and flats which are cut across by small ravines and creeks. Muskegs occur, which must be avoided. The clearing is fairly heavy through spruce.
- Mile 60-75 The gravel flats give place to side hills on this section and the construction costs will be higher. Some rock work will be unavoidable.

- Mile 75-80 Fort Grahame is at mile 75 on this route, and is described in the east route. Opposite Fort Grahame at mile 77, Ross Creek flows through a wide valley, and from mile 75 to mile 77 the construction will be heavy side hill work, grading down to the valley of the Finlay at Ross Creek. From mile 77 to mile 80 the work will be light.
- Mile 80-92 From Ross Creek to the crossing of the Inginika river at mile 92, advantage can be taken of good gravel flats. At mile 90 an old waggon road leads up the Inginika valley to Inginika mines. These mines have been partially developed, but at present are shut down, only a watchman being at the mine. The Inginika river, which rises in large lakes, is a clear water stream, swift, but having good banks. A good crossing was found near the junction with the Finlay river. A 300-foot bridge will be required, with some protection work.
- Mile 92-107 From the Inginika river north, the country flattens out into good gravel flats extending for 15 miles. The heavy work encountered on the east side route at Deserter's Canyon is completely avoided on the west side by using the high level benches.
- Mile 107-120 From mile 107 to 120, the benches are more cut up by ravines and gulches. The best location would be to keep the grade above the level of the high cut banks on the Finlay river, which are characteristic of this section. Some of these cut banks are 300 feet high, of blue clay, and continuously being weathered and falling in. Good flats occur behind them, which can be utilized.
- Mile 120-130 Rough benches and muskegs occur in this section, with considerable clay soil, which may require corduroy. Russell Creek is crossed at mile 130. The pack trail from Fort Grahame to Fort Ware crosses to the west side of the Finlay at Russell Creek.
- Mile 130-151 A flat country with many lakes and large swamps and muskegs, which can be avoided by following the gravel ridges. Clearing

Mile 130-151 will be heavy, also corduroy and culverts. The Finlay river is (continued) reached at mile 149 (Fort Ware) and requires a three hundred foot bridge. Fort Ware has been described in the eastern route. Mile 151 of the western route corresponds to mile 157 $\frac{1}{2}$ on the easterly route, being 6 $\frac{1}{2}$ miles shorter.

C l a s s i f i c a t i o n
Grading Surfacing Bridging
West Side of Finlay River
Manson River Mile 0 to Mile 151 Fort Ware

Mile	Grading, Surfacing, Culverts (miles)			Concrete and Steel Bridges Length of opening (feet)						Remarks	
	Light	Medium	Heavy	50	100	150	200	300	400		
0 - 30		30		1							
30 - 31			1			1					Bridge over Omineca river
31 - 50	10	7	2	3							
50 - 60	4	6		2							
60 - 70	3	3	4	4							
70 - 80	2	3	5	3							
80 - 92	5	5	2	2				1			Bridge over Inginika river
92 - 100	8			1							
100 - 110	8	2									
110 - 120	2	2	2		1						
120 - 130	2	6	2	2	1						
130 - 140	3	3	4	2							
140 - 151	6	4	1	1				1			Bridge over Finlay river
Totals	53	75	23	21	2	1		2			

Estimate of Cost:

53 miles of light construction at	\$10,000 per mile	\$ 530,000
75 " " medium	" " \$15,000 " "	1,125,000
23 " " heavy	" " \$25,000 " "	575,000
21 bridges 50 feet long	\$10,000	210,000
2 " 100 " "	\$30,000	60,000
1 " 150 " "	\$50,000	50,000
2 " 300 " "	\$100,000	200,000

Cost on West side, 151 miles, \$2,750,000.
Manson river to Fort Ware, \$2,750,000.

Fort Ware to Sifton PassMile 151 to Mile 191

- Mile 151-160 The first seven miles is across a flat gravel plateau lightly timbered with jackpine on the east side of the Fox river. At mile 160 it is proposed to cross the Fox river to the west bank to avoid some heavy side hill work on the east side. A bridge of 150 feet would be required.
- Mile 160-167 The benches on the west side are followed but at mile 167 the Fox is again crossed above the junction with the east fork. It is to be noted that the East Fork is really the principal stream; above its junction the Fox river is only a small stream. The Fox is navigable by river boats up to the East Fork at anytime except low water.
- Mile 167-173 Between the two branches of the Fox there is a good gravel ridge which should be followed to mile 173 to avoid large muskegs. At mile 173 is a large Indian encampment. The east fork swings east out of the Rocky Mountain trench.
- Mile 173-191 The valley gradually narrows towards the height of land at mile 191, and some side hill work and a good deal of corduroy will be necessary. Sifton Pass is a swamp half a mile in width. Just north of the summit the branches of the Kachika river rise and flow northwards.

At Sifton Pass my work and report joins that of Mr E.C.Lamarque.

14
15
16
17
18

Classification
Grading Surfacing Bridging
Fort Ware to Sifton Pass
Mile 151 to Mile 191

Mile	Grading, Surfacing, Culverts (miles)			Concrete Steel Bridges (feet)			Remarks
	Light	Medium	Heavy	50	100	150	
151-157	6						
157-160		2	1	2		1	Bridge over Fox river
160-167	2	4	1	2			
167-175	2	4	2	1			
175-180	3	2					
180-191		10	1	3	1		Bridge over Fox river
Totals	13	22	5	8	1	1	

Estimate of Cost:

13 miles of light construction at \$10,000 per mile	\$130,000
22 " " medium " 15,000 " "	330,000
5 " " heavy " 25,000 " "	125,000
8 bridges 50 feet long	80,000
1 " 100 " " 30,000	30,000
1 " 150 " " 50,000	50,000
	\$745,000

Cost, Fort Ware to Sifton Pass,
 forty miles, \$745,000.

14

15

16

17

18

Estimate of Cost:Manson River Mile 0 to Sifton Pass Mile 191
Via Finlay Forks and East Side of Finlay River

Manson River Mile 0 to Fort Ware Mile 157.5	\$3,550,000
Fort Ware Mile 151-157.5 to Sifton Pass Mile 191	745,000
Add for engineering and contingencies	<u>500,000</u>
Total cost, 197.5 miles	\$4,795,000

Manson River Mile 0 to Sifton Pass Mile 191
Via West side of Finlay River

Manson River mile 0 to Fort Ware Mile 151	\$2,750,000
Fort Ware Mile 151 to Sifton Pass Mile 191	745,000
Add for engineering and contingencies	<u>440,000</u>
Total cost, 191 miles	\$3,935,000

Comparison of Routes:

Cost via east side of Finlay river, 197.5 miles	\$4,795,000
Cost via west side of Finlay river, 191 miles	<u>3,935,000</u>
Difference in favour of west side	\$ 860,000

The west side of the Finlay river as shown on the map is therefore considered the better route to locate, as in addition to being shorter and cheaper, I consider that the rivers crossed on the west side of the Finlay are more easily bridged and are not subject to extreme freshets. The east side rivers, including the Finlay at Finlay Forks, will require a great deal of protection work at bridge sites as they are all glacial streams and very swift. The Omineca river, which is the worst on the west side, has a good bridge over Black Canyon.

It must be pointed out, however, that Mile 0 to Mile 27 of the easterly route would form a part of a road to the Peace river. The estimated cost of this 27 miles in these estimates is \$750,000¹. It would appear therefore, that this amount would be a saving to the Government of British Columbia if the Peace river road is considered.

Note. 1. \$965,000. Arthur Dixon.

14
15
16
17
18
19

Insofar as the British Columbia - Yukon highway is concerned, the better side of the Finlay river is the west side.

Natural Resources

Agriculture

At present very little farming has been attempted in the Finlay valley. At Finlay Forks there are good gardens, and also at Fort Grahame. Potatoes are grown successfully at Paul Creek. There are quite large areas of very good bottom land, covered with poplar and small willow, growing good summer feed for stock, occurring between Fort Grahame and Paul Creek, while Indian garden patches were noticed all the way up the Finlay.

It is quite possible that experiment would prove that a considerable area of good agricultural land was suitable for mixed farming. Pack horses are wintered successfully all through the valley.

Minerals

Silver lead properties have been held by location for a number of years in the lower Omineca river. A mica deposit has been worked at Fort Grahame.

A few miles up the Inginika river, the Inginika mines spent a large amount on development work, but at present are closed down.

On Wedge river a very large ledge of copper is reported, with considerable work done on it.

Cost of freight in and out of the Finlay has been the main handicap to development. More extensive prospecting might uncover some good properties. Freight rate at present on supplies from Prince George are five cents per pound at Finlay Forks, rising on a general scale to eight cents a pound at Fort Ware. This high cost of freight prohibits the average prospector from exploring the mountains bordering the Finlay river.

Timber

Spruce up to 12 and 15 inches in diameter is plentiful, but is of inferior quality. Large cottonwoods up to 24 inch diameter are found in the river flats. There is a small sawmill working at Finlay Forks, cutting only sufficient for local requirements.

Game

Although moose are very plentiful in the Crooked and Parsnip river valleys, they are scarce in the Finlay valley, due to the large number of wolves.

Cariboo are very scarce, only one being seen during the season.

Fur of all descriptions seems to be plentiful, there being about twenty trappers in the Finlay who make about \$500,00 each during the season.

Weather

The weather during the three months spent in the Finlay river valley was very wet. Forty-five days' rain were noted, which is phenomenal for that area. Rivers continued high during July and August.

Snowfall

From information received from game officers and trappers, snowfall in the Finlay valley is not heavy; about three feet of snow on the ground is the usual amount during an average winter. During the winter of 1939, snowfall was particularly heavy, having seven feet at Summit Lake and about the same in Sifton Pass.

Engineering Work done on the Finlay River Reconnaissance - 1939

Compass chain	75 miles	Cross section
" page	80 "	" "
Transit stadia	21 "	River crossing
Total mileage covered by report - 350 miles.		

Party Employed:Equipment

A.E. Warburton, Assistant Engineer	2 river boats, 38 feet long
A.C. Kinghorn " "	2 24 h.p. P.Kickers
2 rodmen	1 sending and receiving radio
2 boatmen	1 transit
1 cook	1 camera
	Survey equipment

Time in field work - three months.

Note: The panoramic views referred to in this Report are filed with the records of the British Columbia - Yukon - Alaska Highway Commission.

14

15

16

17

18

19

Before closing this report, I would like to record the good work done by my assistants and men. Field work was arduous at all times, due to wet weather and to heavy undergrowth which had to be gone through, but in spite of this, a very large area was covered in the short time at our disposal.

Photographs

Photographs shown in this report of panoramic views taken from high points in the mountains, were obtained through the courtesy of Mr Norman Stewart and Mr Jackson of the Photo Topographic Survey, who were working in the Finlay Valley.

SUPPLEMENTARY ESTIMATE

Mile 0 - Mile 191 - British Columbia - Yukon Highway Manson River to Sifton Pass

Increase in cost of roadbed construction due to widening
from 24 to 28 feet in cuts

On 66 miles of light construction at \$10,000 per mile Add 10 per cent, or \$1,000 per mile	\$ 66,000.00
On 97 miles of medium construction at \$15,000 per mile Add 15 per cent, or \$2,250.00 per mile	218,250.00
On 28 miles of heavy construction at \$25,000.00 per mile Add 20 per cent or \$5,000.00 per mile	140,000.00

Gravel

Extra cost of 24-foot wide gravel instead of 20' wide - \$370.00 per mile on 191 miles	70,670.00
---	-----------

Hard Surfacing

Based on estimate of \$6,000 per mile at Prince George Add to above, freight \$2,000.00 per mile - Total surfacing cost, Manson river to Sifton Pass - 191 miles at \$8,000.00	1,528,000.00
---	--------------

<u>T o t a l</u>	2,022,920.00
------------------	--------------

(Signed) J.M.ROLSTON

Note re Surfacing by Arthur Dixon: I consider the estimate for surfacing to be inadequate. The Surfacing Engineer has gone into the question in detail and is assured that the cost will not be less than that shown in his report.

Atlin Electoral District

British Columbia - Yukon - Alaska Highway Reconnaissance - August to November,
by T. E. Clarke. 1939.

ROUTE NUMBER 1.

Datum - sea level. Elevations taken by Aneroid readings checked from base station, or average of two days' readings. Costs estimated at Southern British Columbia costs plus 50% for a twenty-four foot road, sixty-six foot clearing, and gravel surfacing, where necessary.

From Atlin, at an elevation of 2,240 feet, Mile 0 for 26.5 Miles south-easterly on the existing O'Donnell River Road to an elevation at Mile 26 of 3200 feet. Material: - earth, gravel and scattered solid rock points. Present width twelve feet, could be widened to twenty-four feet, grades and alignment improved for \$10,000.00 per mile.

Mile 26.5 approximately along the existing trail crossing the O'Donnell River with a 60 ft. span to Dixie Lake, Bell, Thyson (locally called Paddy's) Lakes, and the telegraph line to above Nakina crossing, Mile 59 at an elevation of 3,300 feet; Bell, Thyson Lakes and above Nakina Crossing being the highest points at an elevation of 3300 feet. Material: earth gravel, boulders, and 25% black muck and gravel, and swamps. There is good drainage throughout the whole section. The timber is spruce and jack pine, mostly small and scattered. Estimated cost --- \$15,000 per mile.

Mile 59 - On the northeast side of the Nakina River for ten miles, benches and sidehill, averages slop fifteen degrees to forks of Nakina and Little Nakina, Mile 69, at an elevation of 2550 feet at the Forks and crossing the Nakina with a sixty foot span. Materials: sand, gravel and short solid rock points; timber - spruce, jack pine and balsam, six to eight inches in diameter. Estimated cost \$20,000 per mile.

One half-mile of rock work on north-west side of Little Nakina at Forks. Estimated cost \$30,000 per mile.

Mile 69.5 - Up Little Nakina on northeast side for 19.5 to headwaters lake on telegraph line, Mile 89; at an elevation of 3,100 feet, the summit between the Nakina and Nihilin Rivers. Three miles sand, gravel and scattered rock points. Estimated cost..... \$15,000 per mile

and 16.5 miles on sand and gravel benches.....est. cost \$ 7,000 per mile.
One forty foot span.

15
16
17
18

The valley is one half to one mile wide, good grass, and scattered clumps of Jack Pine and Poplar.

Mile 89 - Approximately following telegraph line, down North Fork of Nihlin to elevation of 2200 feet and up Nihlin River to bench above Nihlin telegraph station, Mile 121, at an elevation of 3000 ft. Material: earth, gravel, short solid rock points and swamps; benches and side hill. Spruce, Jack Pine and Poplar; in river bottom scattered Spruce up to thirty inches. Estimated cost -----\$15,000 per mile, and one forty foot span.

Mile 121 - Up Nihlin and northwest Fork of Nihlin to Nihlin - Trail Creek (Tuya River drainage). Summit, Mile 157.5 at an elevation of 3,900 feet. The highest summit on this route between Atlin and the Stikine River. Material: sand gravel and short swamps; benches and side hill. Spruce, Jack Pine and Poplar. Estimated cost \$12,000 per mile.

Mile 157.5 - Crossing Trail Creek, and down on benches on southwest side of Tuya River, down Tuya on benches on west side, one half to two miles back from river, to top of bank on north side of Mansfield (locally called Coal) Creek at Mile 193, at an elevation of 2,500 feet. Material: earth, gravel and 15% of black muck and swamps. Spruce and scattered Jack Pine. Estimated cost -----\$15,000 per mile.

Mile 193 - To top of bank on south side of Mansfield Creek, Mile 195, at an elevation of 2,500 feet. Water level of Creek 2,000 ft. This Creek is 500/^{ft.}below the benches on either side, this depth does not change much in the next eight to ten miles up. Sides of valley: earth, clay and gravel; some short slides. Average slope is 20 degrees. Spruce and poplar. Estimated cost -----\$18,000 per mile. one forty foot span.

Mile 195 - South to Clasey (locally called Grassy) Creek, Mile 201, two miles south of S.W. Corner Lot 5472, I.R.; crossing Creek at an elevation of 2,200 feet. Material: earth and gravel benches, burnt over. Estimated cost -----\$ 9,000 per mile.

Mile 201 - Down Classy Creek and on benches above Tuya River

15
16
17
18

to existing Telegraph Creek-Dease Lake Road at Mile 18 from Telegraph Creek. Mile 211.5 at an elevation of 1,900 feet. Material: earth, gravel and short swamps, benches and side hill. Spruce, Jack Pine and Poplar. Estimated cost -----\$12,000 per mile.

Mile 211.5 - On existing road to twelve miles from Telegraph Creek and at the mouth of the Tahltan River. Mile 217.5 at an elevation of 1,000 feet. Material: earth and gravel benches and side hill. Jack Pine and Poplar. Estimated cost to improve grades and alignment -----\$ 9,000 per mile.

Mile 217.5 to 218 - On existing road on lava beds and approach to proposed bridge. Material: Solid rock. Estimated cost-----\$15,000 per mile.

Mile 218 - Crossing of Stikine River. Material: solid rock (lava shattered on north side, solid on south side). Present water level - 700' high water - 730'.
Elevation of deck 900'
Width at deck level 550'
" " H.W. " 250'
" " present " (Nov.20) 155'
Estimated cost ----- \$300,000.

On South side of Stikine River.

Mile 218 - Southerly up draw to Mile 220. Material: earth, gravel and scattered solid rock points; side hill average slope 30°. Estimated cost ----- \$20,000 per mile.

Mile 220 - South-easterly above river to Mile 222 at an elevation of 2,210 feet. Material: earth and gravel side hill, average slope 30°. Estimated cost ----- \$16,000 per mile.

Mile 222 - 225.5 - Days Lake at an elevation of 1,960 feet. Material: earth and gravel bench. Light Poplar. Estimated cost----- \$ 8,000 per mile.

Mile 225.5 - 231 Southeasterly on bench on west side of Klastline River at an elevation of 1,780 feet. Material: earth and gravel bench. Light Poplar. Estimated cost -----\$ 8,000 per mile.

Mile 231 - 279 - Klappan River where trail crosses river south-east of Klappan Summit. (Distance scaled from map, covered by former reconnaissance).

The snowfall as given by trappers and settlers who have been there for some years, and checked, where possible, by information from two or

.....

15
16
17

three, is as follows:

Mile 0	--	Mile 49	Average	2 - 3 feet
			Maximum	5 feet,
Mile 49	-	MILE 190	Average	2.5 feet
			Maximum	3.5 feet
Mile 190	--	Mile 231	Average	15 inches,
			Maximum	2.5 feet

Light, dry snow.

Average year first snow to stay.....1st-15th November,

Heavier falls over by.....1st February

Snow mostly gone by.....15th April.

These records are of the snow as it is on the ground the latter part of February, and early in March.

The timber is scattered, and of no commercial value, except where near settlements for local use or for mining purposes.

<u>Mile to Mile</u>	<u>Distance</u>	<u>Estimated cost</u>	<u>Cost.</u>
	<u>Miles</u>	<u>per mile</u>	
0	26.5	26.5	\$10,000
26.5	59	32.5	15,000
			One 60' span
59	69	10	20,000
			One 60' span
69	69.5	0.5	30,000
69.5	89	3	15,000
		13.5	7,000
			One 40' span
89	121	32	15,000
			One 40' span
121	157.5	36.5	12,000
157.5	193	35.5	15,000
193	195	2	18,000
			One 40' span
195	201	6	9,000
201	211.5	10.5	12,000
211.5	217.5	6	9,000
217.5	218	0.5	15,000
218			Stikine River Bridge
218	220	2	20,000
220	222	2	16,000
222	225.5	3.5	8,000
225.5	231	5.5	8,000
231	279	48	Covered by former reconnais- sance
			\$3,319,700.00
			Minus Stikine River Bridge
			300,000.00
			3,019,700.00

Average cost per mile (bridges included except Stikine River) - \$15,072.00

Atlin Southeasterly to Dease Lake.

Datum and costs estimated as for Route No. 1.

Route No. 1, Mile 0 to Mile 183 equals Route No.2 to Mile 183.

From Route No. 1, Mile 183, on bench on west side of Tuya River at an elevation of 2,900 feet to top of bank on west side of Tuya River two miles north of West Fork of Tuya River, Mile 190, at an elevation of 2,800 feet. Material: earth, gravel and 15% black muck and gravel and swamp. Estimated cost -----\$12,000 per mile.

Mile 190 to bench at east side of Tuya River, Mile 193, at an elevation of 2,800 feet; crossing the Tuya with three sixty-foot spans at an elevation of 2,400 feet. Material: earth, gravel and clay, short slides and soft spots, side hill average slope 20 degrees.

River crossing - Tuya River:

Highwater to high water	180 feet,
Width at present water level (Oct.27)	100 feet.

River bottom and to above high water large boulders and gravel. Good approach on both sides. Bridge on existing road lower down has centre pier of rock-filled crib, which appears to have been there for years.

Timber - Spruce and Balsam. Estimated cost -----\$18,000 per mile.
Bridge ----- 14,300.00.

Mile 193 - Easterly five miles to a point on the existing Telegraph Creek-Dease Lake Road, thirty-nine miles easterly from Telegraph Creek, - Mile 198, at an elevation of 2,400 feet. Material: earth, both gravel and clay. Timber - Spruce, scattered Jack Pine and Poplar. Estimated cost -----\$12,000 per mile.

Mile 198 - On existing road easterly for 31 miles to a point 70 miles easterly from Telegraph Creek and 3 miles west of Dease Lake - Mile 229, at an elevation of 2,500 feet. Material: earth, gravel, clay, short stretches of black muck and swamps. Timber: Spruce, scattered Jack Pine and Poplar. Estimated cost to improve existing road - \$9,000 a mile.

Mile 229 - Up Tanzilla River and Goat Creek, down Ptarmigan Creek, crossing Stikine River and up Klappan River to where trail crosses river southeast of Klappan Summit.

Route No.2, Mile 281 equals Route No.1, Mile 279. (Distance Mile 229-Mile 281 scaled on map. This has been covered by former reconnaissance.)

15

16

17

18

19

The snowfall as given by trappers and settlers who have been there for some years, and checked, where possible, by information from two or three sources, is as follows:

Mile 0	-	Mile 49	Average	2 - 3 feet
			Maximum	5 feet
Mile 49	-	Mile 198	Average	2.5 feet
			Maximum	3.5 feet
Mile 198	-	Mile 229	Average	2.5 feet
			Maximum	3.5 feet

of light, dry snow. Average year first snow to stay - 1st to 14th November; Snow mostly gone by the 15th April. These records are of the snow as it is on the ground the latter part of February and early in March.

<u>Mile to Mile</u>	<u>DISTANCE MILES</u>	<u>Estimated Cost per mile</u>	
0	183	183	Route No.1 \$2,444,700.00
185	190	7	\$12,000 84,000.00
190	193	3	18,000 54,000.00
			3 sixty ft.spans -14,300.00
193	198	5	12,000 60,000.00
198	229	31	9,000 279,000.00
229	281		Covered by former recon- naissance.
			\$2,936,000.00

Average cost per mile (bridges included) to Mile 229 equals \$12,821.00

There will be a difference in the cost of crossing the Stikine River; also Route No.2 has not the long grades in and out of Mansfield Creek and the Stikine River lower down than Route No. 1 has.

15

16

17

18

19

LINE " A ".

Down the White Swan Valley and through a low pass to the Little Nakina River.

From the south end of Gun Lake at an elevation of 3,100 feet, and three miles from Route No. 1, Mile 121 at Nihlin Station; for thirty-four miles to the North end of Lake Chismania at an elevation of 2,800 feet, and the beginning of pass to the Little Nakina with a summit of 3,000 feet. Thence ten miles southwesterly to the Little Nakina and Route No.1 at Mile 81.5.

A total distance of forty-seven miles against 39.5 miles by Route No.1.

The White Swan and Summit Valleys are from six to eight miles wide and full of lakes and low hills; the road would follow the side hill on the west side, at an estimated cost of \$12,000 to \$18,000.

I consider Route No.1 via Nakina and Nihlin Rivers a better and cheaper route.

LINE "B"

Leaves Route No.1 at Mile 186, twentyfive miles southeasterly from Nihlin Station; thence fifty-eight miles southeasterly to the Telegraph Creek-Dease Lake Road, 18 miles from Dease Lake.

From Route No.1, Mile 186, at an elevation of 3,300 feet, seven miles easterly up a good valley to Summit Lake at an elevation of 3,500 feet, and the Nihlin-Tuya River summit. Estimated cost - \$10,000 per mile.

Thence twenty miles easterly through a country of lakes, swamps and hills 200-400 feet high of earth, gravel and solid rock. Estimated cost \$15,000 per mile. Thence down the bench on the east side of the Tuya for twelve to fifteen miles at an elevation of 3,600 to 3,300 feet. The Tuya River is 250 to 300 feet below this bench, which is mostly wet and swampy, with numerous creeks in deep valleys flowing into the River. The banks of the creeks and the Tuya are of scattered rock points and glacial mud, with numerous slides from top to bottom.

As I did not consider this a suitable country for highway construction if anything else could be found, and the travelling being very bad on these benches, we left them and travelled southeasterly over the mountains to the Telegraph Creek-Dease Lake Road.

REPORT ON A RECONNAISSANCE BETWEEN MOUTH OF GAFFNEY CREEK
AND FINLAY FORKS - A DISTANCE OF 40 MILES - October, 1939.

by L. Keith.

This reconnaissance was undertaken in order to report on the country and indicate the choice of route for a road from Gaffney Creek, continuing the McKenzie Highway from that point to Finlay Forks.

It was apparent that this route of necessity must follow the Manson River for the first fifteen miles at least, follow very closely the course of the river itself. After examining both banks, the northerly and westerly bank was chosen, as on the whole affording more economical construction.

From there on two possible routes opened up -- the one approximately as I have indicated on the accompanying sketch, the other crossing the Manson River, say at a point near the intersection of the River and the 124th Meridian, thence following the course of the river to the east and approaching the Forks on the Ridge between the Manson and Parsnip Rivers. This entails a crossing of the Manson, and of necessity a crossing of the Finlay on river bottom land near the confluence of all the streams, thus being in danger of flood destruction during exceptionally high water conditions.

For these reasons I favour the route I have indicated. Also from near the crossing of Deep Creek, this location lends itself to a continuation in the future, north and westerly to the Black Canyon, on the Omineca and so north up the Finlay River.

Leaving the highway at Gaffney, the proposed location proceeds for some two and a half miles on level gravel benches with light Jack Pine growth, then between the first and second creeks shown on sketch some fairly steep hillside is encountered, with a small proportion of loose rock. Between the second and third creeks crossed, some solid rock is encountered; it is impossible to avoid this rock, as to extent there are two stretches of say one quarter of a mile in length, mostly loose rock and some solid. From this point, that is the third creek crossing, for a distance of three miles to the creek crossing immediately south of Wilton Creek, the ground is mostly level and good material -- Jack Pine growth. From this last mentioned point, which is approximately

16

17

18

19

nine miles from Gaffney for a further distance of five miles the benches are broken, and about fifty per cent of the grading will be heavy side hill work, perhaps a small percentage of loose rock, also clearing and grubbing will be heavy. This takes us to the fourteen mile point. The next three miles to the crossing of Crescent Creek is high and dry bench, excellent material and light clearing, mostly Jack Pine.

Crescent Creek Crossing is, say, Mile 17, from this point to the Crossing of the Finlay River -- a distance of, say, 23 miles -- the greatest portion of the ground is perfectly flat, and follows the same bench to Deep Creek. The clearing is, on the whole, very light, though some very heavy windfall is encountered. The material is mostly white clay with gravel in places. It will be necessary to haul gravel some three or four miles in spots. The creek crossings are not difficult, say 5 - 50 ft. bridges being needed, other creeks and drainage being taken care of by small trestles and culverts.

I consider a point three miles west of the Meridian line on Deep Creek a control point, as nearer the Manson, clay is more in evidence and the creeks cut very deep.

The crossing as indicated at the Finlay I estimated as 970 feet, and a suitable location for either a bridge or a ferry, both banks being sound and above high water, a moderate current prevailing.

Over the entire distance, there is no grade problem, and a good general alignment should be procured easily.

L. KEITH.

16

17

18

19

20

ESTIMATE OF COST.

30 Miles - 1500 cubic y. rds earth per mile - 45,000 cu.yds @ 50¢ -	\$22,500.00
10 Miles - 3000 " " " " - 30,000 cu.yds @ 50¢	15,000.00
1500 " " loose rock 1,500 cu.yds @ 75¢	1,125.00
400 " " solid rock 400 cu.yds @ \$3.00	1,200.00
40 Miles clearing 54 ft. wide @ \$400. per mile	16,000.00
40 Miles grubbing \$300. per mile	12,000.00
Bridges - say 5 - 50 ft. Bridges @ \$2,000.	10,000.00
say 15 small trestle spans and culverts @ \$500.	7,500.00
Foundation excavation and Bridge fill - 3000 cu.yds.@ 75¢	2,250.00
Gravel - free haul 10,400 cu. yds. @ 40¢	4,080.00
overhaul - average 2 miles 10,400 cu.yds. @ 80¢	8,160.00
Engineering - Location	4,000.00
Supervision	3,000.00
	<u>3,000.00</u>
Total.....	\$106,815.00
Total per mile	\$2,670

Estimate made from observations made during reconnaissance and consideration given to the necessarily high cost of transportation.

16

17

18

19