

Engineering and
Construction Service. DEPARTMENT OF MINES AND RESOURCES
Surveys and Engineering Branch

Banff, Alberta,
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REPORT ON ALASKA-YUKON HIGHWAY
RECONNAISSANCE.
ATLIN DISTRICT TO THE TUYA RIVER

On receipt of instructions sent on behalf of the Commission by air mail on September 5th with reference to the urgency of reconnoitering the country first hand south and east of Atlin, the reconnaissance work on the Pelly River section was curtailed to the inspection of bridge sites between the river confluence with the Yukon and Granite Canyon, and arrangements were made to proceed to Whitehorse and then to Atlin, which point was reached on the afternoon of the 19th of September.

From Atlin, as a base, a reconnaissance was made of the various routes approaching the town from the south and extending northerly towards Whitehorse or Teslin Lake via the east shoreline of Atlin Lake, and by the Fourth-of-July Creek and Surprise Lake valleys. Photographs 1 to 4 show the terrain which would be traversed along the Fourth-of-July Creek and Porter River valleys; photographs 5 to 8 show a panoramic view of the east shoreline of Surprise Lake.

For convenience in following this report, I have prepared a large scale sketch map of the northwest section of British Columbia and the Atlin District, which extends from Atlin Lake on the Interprovincial boundary of the Yukon Territory, latitude 60° , longitude 134° , to the Stikine River section, latitude 58° , longitude 130° . Superimposed on the sketch I have shown, in colours and legendary markings, the various routes reconnoitered between the town of Atlin and the Tuya River.

Proposed Route "A" is shown in a dash line coloured red, and extends from the town of Atlin, which is situated on the east shore of Atlin Lake about thirty (30) miles south of the Interprovincial Boundary, and at an elevation of 2240 feet above sea

level. From this point the route follows a south-easterly direction along the existing O'Donnel River road for a distance of twenty-six (26) miles. Here, at an elevation of 3,200 feet, the route leaves the O'Donnel River road, and traverses approximately along the old Telegraph Trail to Ruth Lake, Mile 51. A crossing of the O'Donnel River would be made at Mile 27, with a 50-60 ft. Truss or Steel Girder bridge. Photograph No. 9 taken from a point on the O'Donnel River road at Mile 26 shows the physical features of the country in the vicinity of O'Donnel River crossing and along the east shore of Dixie Lake, seen in the middle distance.

From the crossing of the O'Donnel River the route would follow the east shore of Dixie Lake, crossing a flat divide on the watershed between Dixie Lake and Paddy Lake, and thence following the right limit of Bell Creek to near the outlet of Bell Lake, Mile 45. Some difficulty may be encountered here, to find a suitable crossing of Bell Creek as the ground appears to be very marshy around the south end of Bell Lake, and it may be found advisable to cross Bell Creek to the left limit before reaching the Lake. After leaving Bell Lake another flat divide is crossed and the west shore of Taysen and Ruth Lakes would be followed to a crossing of Ruth Creek below the outlet of Ruth Lake, from which point it would be advisable to maintain the elevation attained along the divide, and keep to the higher benches above Nakina Telegraph Station, Mile 59 at an approximate elevation of 3,300 feet. This will be necessary to avoid excessive construction costs that would be met with in following the valley bottom of Ruth Creek on the Nakina River in view of the precipitous nature of these valleys in the vicinity of Nakina Station, and easterly for a distance of at least ten (10) miles. This may be seen from aerial view No. 10 which was taken from a point east and above Telegraph Station, looking up the Nakina to the junction of the Little Nakina River, Mile 69.

The country traversed by the preceding paragraphs

is the same as that covered by Mr. T.E. Clarke, Provincial Engineer for the Province of British Columbia in his report dated August to November 1939. Estimated cost on this section submitted by Mr. Clarke is reasonable for a gravel surfaced road, but would be slightly low for a completed road section that may possibly be hard surfaced within a few years after completion.

At Mile 69 we have a choice of two routes, the "A" route shown following the east branch of the Nakina to its headwaters on the west watershed of the White Swan River, and the other route "B" following the main branch of the Nakina River to the divide and watershed of the west branch of the Nahlin River. This latter route was followed by Mr. Clarke to a point above the Nahlin Station and thence up the Nahlin River to its headwaters at Trail Creek summit. A diversion from the route followed by Mr. Clarke is made at Mile 100 on the Nahlin watershed. Here I would suggest maintaining approximately the elevation attained while crossing the divide and keeping to the higher benches down the left limit of the west branch of the Nahlin River; this would avoid excessive precipitous gradients when approaching the watercourse of Gun Creek and the east branch of the Nahlin River, Mile 126 and Mile 130.

The aerial photograph No. 11 taken from a point over Mile 95 on Route "B" looking down the Nakina River shows generally the widening out of the valley bottom in approaching the saddle or divide between watersheds. Unfortunately other aerial views taken of the summit and down the northwest branch of the Nahlin were unsuccessful. However, photographs 34 to 36 taken from the ground show more clearly the general ground features and the reason for my suggestion that any projected alignment be run along the higher benches adjacent thereto.

Continuing the traverse of Route "B" from Mile 130 to the junction with Route "A" at Mile 137, the terrain traversed is partly sidhill and benchland lying between the south end of Gun Lake and the deep watercourse valleys of the East branch of

the Nahlin River and Stump Creek. Photographs 31 to 33 show the ground features above the valley bottom to be generally rolling benchland, open marshes and lightly timbered jackpine, spruce and poplar ridges. Southerly along the benches above the main branch of the Nahlin River the ridges are more thickly timbered with spruce.

Resuming the traverse of Route "A" from Mile 69, this route would follow the benchland above the watercourse of the east branch of the Nakina River to the summit of the watershed between the Nakina and the White Swan River, Mile 85. The elevation of the summit is approximately 2,900 feet and easy grade approach is made from either the Nakina or White Swan Valleys, as may be seen from a study of photographs 12 to 16. The ground feature of the country traversed between Mile 87 and Mile 92 consists of numerous short ridges interspersed with small lakes and marshes, and heavily timbered with spruce and poplar. North of Mile 92 to the Hutsagola Lakes the terrain is somewhat more open with rolling spruce, pine and poplar benches which show indication of an old twenty year burn which has been instrumental in drying out the swampy marshland generally encountered throughout undeveloped country in the northern parts of the interior of British Columbia.

From two high ridges in the vicinity of the Hutsagola Lakes Mile 100 several panoramic photographs were taken which show more clearly the country that would be traversed by Route "A" from Mile 92 to Mile 110. At the latter mileage the White Swan River flanks the lower slopes of the west side of the White Swan Valley for about twenty miles to near the upper end of Long Lake, and although several spruce and pine benches were seen from the air to the west of the river the terrain appeared more precipitous than at points lower down the valley of the White Swan. The crossing of the creek which drains from Disella Lake would require a 50 to 60 Truss or Steel Girder span and would be crossed above its confluence where it empties into Long Lake. At this

point Disella Lake lies on a high plateau probably about 600 feet above Long Lake which has an elevation of about 2,900 feet. Disella Creek watercourse throughout its entire length after leaving Disella Lake is precipitous and traverses a deep rocky ravine for about one and a-half miles, before emptying into Long Lake.

From the upper end of Long Lake to Mile 147, the junction with Route "B", the country traversed is generally rolling benches timbered with spruce, pine and poplar. Small lakes and swampy ground, not shown on the map, are met with after passing Mile 135 but generally these can be avoided by following the higher benches. Marsh and swampy ground lack drainage due principally to vegetable growth and could be drained by offtake ditches, and by opening up watercourses which have become overgrown with vegetation and windfalls. Photographs Nos. 26 and 27 taken from a point above the White Swan River near Mile 131 show the edge of an old burn which followed the east side of the watercourse for four or five miles at this point. Views 28 and 29 show the shoreline of Prairie Lake and the flat low lying divide on the White Swan and Nahlin River watersheds. Views 30 and 31 show the head of Stump Creek where it flattens out on the watershed of the White Swan and Nahlin River. At this point Route "A" and "B" would cross to the benchland to the east of Stump Creek and the Nahlin River.

The choice of the continuance of the Route "A" via the White Swan from Mile 69 to its junction with Route "B" at Mile 147 is dependent on two factors: First, the possibility that the main route to the Lewes River may follow the Teslin Lake and the Teslin River, or - Secondly, the main route to be projected via Atlin Lake, Marsh Lake and Whitehorse. If the latter is adopted, then the alternative route "B" from the head of Stump Creek to Mile 69 would be the most logical route to take, as it is more direct and although construction costs per mile would be similar, it is estimated to be about ten miles shorter,

and therefore a considerable saving in construction cost would be effected by traversing Route "B".

Continuing the traverse of Route "A" or "B" from the head of Stump Creek, Mile 147, to the Summit Pass on the watershed of the Nahlin, and the Little Tuya River, a choice of an alternative Route "B.B" is shown. The limited time at my disposal prevented me from making a reconnaissance of the country approaching the divide from the north and the feasibility of taking this route to cross the watershed between the Nahlin and the Tuya would have to be further investigated before it really could be considered. From the air, while our plane was flying south, the terrain between Mile 147 and 157 appeared to indicate that the physical features consisted of rolling benches and flat marshes or meadows with rising ridges between Mile 157 and the divide at Mile 162. The elevation of the divide was estimated to be around the 3,500 feet. In approaching the divide from the south photographs Nos. 37 to 39 taken at the north end of Dorothy Lake on the east side of the watershed show the terrain to be very suitable for road construction work, and should the approach from the north be as favourable, I consider this to be the best route notwithstanding the fact that the divide is higher than Summit Pass, shown on Route "A". From the divide Route "B.B" would traverse southeasterly down the west branch of the Tuya to Dorothy Lake and thence via Grayling Lake to a junction with Route "A" at Mile 178 or approximately Mile 170 Route "B.B". This route from Mile 147 to its junction with Route "A" would be six to eight miles shorter.

Resuming the traverse of Route "A" from Mile 147; to avoid the heavy gradients and grading that would be met with in following the river flats, - if any, - of the east branch of the Nahlin River, or the Nahlin River (main), I would suggest keeping to the higher benches above these rivers for about twelve (12) miles above Nahlin Station, as the lower reaches of these watercourses run through a very deep trough in an otherwise

rolling country, as may be seen from Photographs 32, 35 and 36, and to follow the bottom of these streams would incur higher construction costs.

From Mile 160 to Granite Creek the country becomes more difficult and to avoid a high rock ridge it is necessary to leave the benchland and follow the broken country above the Nahlin River to a point above a lake which was named Ranchman, Mile 164, from which point a line of blazes was made to a point below Granite Lake, Mile 170, where the valley of Summit Creek is picked up. To follow the Nahlin from Ranchman Lake to the mouth of Summit Creek where some blazes made by Mr. Clarke, Provincial Engineer, were picked up, would entail considerable development to negotiate the steep and precipitous lower section of Summit Creek. From Mile 170 to Summit Pass, elevation 3,330 feet, Mile 175, the traverse would follow the sidehill and benches above the watercourse of Summit Creek on an easy grade. This part of the valley is quite narrow for about a mile, then widens out to near the pass which is not more than 100 feet wide in the bottom, as may be seen from Photograph 41.

From Summit Pass to Little Tuya Lake Narrows, Mile 180, the country is cut up by a series of lakes separated by flat spruce benches and marshes. Considerable ditching will be necessary along this section to open up watercourses and release the surface waters which are held back due to vegetation. Aerial photograph 42 shows the south end of Grayling Lake and the north end of Little Tuya Lake. Ground photograph No. 40 shows a section of Grayling Lake and in the distance the entrance to Summit Pass. The narrows of Little Tuya Lake is approximately 200 feet wide and is about 4 feet deep with a solid gravel rock bottom; the north bank being about 20 feet above water level and the south bank gently sloping flat from the water's edge. This channel can be crossed very easily by a trestle bent bridge and later filled in to a small bridge.

From the Narrows, Mile 180, the traverse would follow

the side benches along the southeast shore of Little Tuya Lake to near the outlet of the river at Mile 182 and thence down the benches above the watercourse of the west branch of the Tuya River to a crossing of the Main Tuya at Mile 197. The limited time at my disposal only allowed me to carry the reconnaissance to about Mile 186 four miles down the west branch from the outlet of the lake. Aneroid elevation showed a fall of approximately 40 feet from the outlet of the lake, and allowing for this drop in elevation to be general, the elevation of 3,100 feet shown at the bridge crossing of the Main Tuya, is assumed.

From the crossing of the Main Tuya at Mile 197 I have suggested the projection of the line down the east bank on benches to a junction with the Telegraph Dease Lake freight road at Mile 232. Mr. Clarke, Provincial Engineer, states in his report on the reconnaissance of the line "B" which was made in the fall of 1939, - that the bench above the Tuya along the east bank was mostly wet and swampy, with numerous creeks in deep valleys, flowing into the river, and that the banks of the creeks and river consisted mainly of scattered rock points, glacial mud with numerous slides and that the east bank along the section was unsuitable for highway construction. In so far as I was able to carry the reconnaissance down the west branch of the Tuya River no evidence was seen of glacial mud or slides. Swampy or marshy ground is general and is a prevalent feature of practically the whole of the country traversed. However, in projecting the line down the west branch of the Tuya River it may be more suitable to cross this stream and follow the west bank down this branch and also the Main Tuya to a crossing of this stream at a point covered by Mr. Clarke's report on his reconnaissance Route No. 2. The distance traversed by the west bank would not change the mileage to any appreciable extent, and although the route followed would not be on the same ground as that indicated in Mr. Clarke's report on Route No. 1, only a slight difference in ground feature might be expected, and would

not be such that a reasonably good alignment could not be established, and that average construction costs would be generally those met with in this section of the interior.

Before concluding reconnaissance survey on the Nahlin, Tuya watershed, a reconnaissance was made up the branch waters of the Summit Creek and the Nahlin River to ascertain if any other more favourable pass or divide on the watershed was available and more suitable than that found at Summit Pass, or on the divide of the west branch of the Tuya. The results here were negative as the summit traversed at Dolly Varden Lake was found to be a divide on the water of the Nahlin and that a high rock ridge, running in a southeasterly direction to the Rising Plateau of Level Mountain, separated the waters of the Nahlin and Tuya Rivers.

No settlements were evident throughout the section covered between O'Donnel Creek and the Tuya River, and although trappers' cabins were in evidence, no trappers were in residence at the time the reconnaissance was made. The only person contacted was the telegraph operator at Nahlin Station, who was glad to extend his hospitality to us and gave such directional information about trails, etc., desired.

Elevations shown were taken by Aneroid Barometer, which were checked against such known elevations when convenient, and at such times with the Altimeter of the plane at all landings and take-offs. Weather conditions were recorded and average readings taken over a period of three or four days.

The following costs are based on a 24 ft. standard road section $2\frac{1}{2}$ feet, at least, above ground surface in level country, a 20 ft. gravel surface, and a sixty-six (66) foot right-of-way stumped and brushed. Native timber would be used for culverts, cribs and small bridges. All other structures imported:

PROPOSED ROUTE "A"

Atlin to Tuya River & Junction
Telegraph-Dease Lake Freight Road
Distance 232 Miles.

ESTIMATED COST

Mile to Mile	Distance in Miles	Estimated Cost per Mile	Bridges	Estimated Cost	Total Estimated Cost
0	10	10			\$ 120,000
10	25	15			150,000
25	59	34			544,000
26.5			1-60' Truss	\$6,000	6,000
59	69	10			200,000
69	76	7			126,000
76	110	34			476,000
110	120	10			160,000
120	128	8			144,000
128	147	19			266,000
147	160	13			182,000
160	164	4			68,000
164	170	6			84,000
170	178	8			132,000
178	180	2			32,000
180	186	6			87,000
186	197	11			154,000
197			1-150' Truss	18,000	18,000
197	232	35			525,000
Total Estimated Cost					<u>\$3,474,000</u>

Average cost per mile, bridges included \$14,974.14.

PROPOSED ROUTE VIA ALTERNATIVE ROUTE "B"

Atlin to Tuya River & Junction
Telegraph-Dease Lake Freight Road
Distance 222 Miles

ESTIMATED COST

Mile to Mile	Distance in Miles	Estimated Cost per Mile	Bridges	Estimated Cost	Total Estimated Cost
0	69	69			\$1,020,000
69	69.5	1/2			15,000
69.5	100	30 $\frac{1}{2}$			427,000
69.5			1-60' Truss	\$6,000	6,000
100	126	26			390,000
126	137-147	11			176,000
137	232-222	85			1,282,000
Total Estimated Cost					<u>\$3,316,000</u>

Average cost per mile, bridges included \$14,936.94.

PROPOSED ROUTE VIA ALTERNATIVE ROUTE "B" & "B.B"

Atlin to Tuya River & Junction
Telegraph-Dease Lake Freight Road
Distance 214 Miles.

ESTIMATED COST

Mile to Mile	Distance in Miles	Estimated Cost per Mile	Total Estimated Cost
0 137-147 "A"	137	Same as Routes "A" & "B"	\$2,034,000
147 157	10	\$14,000	140,000
157 162	5	18,000	90,000
162 170-178 "A"	8	14,000	112,000
178 "A" 232-214	54	Same as Route "A"	816,000
			\$3,192,000

Average cost per mile, bridges included \$14,915.89.

Summarizing the foregoing information, and considering the physical ground features and relative costs between the proposed Routes "A", "B" and "B.B", I would suggest that a line projected from Atlin via O'Donnel Creek, the Nakina, Nahlin divide to the head of Stump Creek, and thence along Route "B.B" via the divide; Dorothy Lake to the Junction of Route "A" Mile 178, and thence by the west branch and Main valleys of the Tuya River, to a junction with the Telegraph-Dease Lake Freight Road, would be the most direct and economical for construction. The highest divide crossed would be approximately 3,500 feet which would not be excessive when it is considered that approximately 70% of the distance traversed will be at an elevation of 3,000 feet.

The distance by this Route would be approximately 214 miles, this distance being scaled from the provincial map and a liberal allowance being made for curvature. The actual distance, if a line were projected, would probably be somewhat less, and the estimated cost of \$3,192,000.00 reduced relatively.

I am enclosing forty-three (43) photographs which were taken during this reconnaissance survey. Photographic

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stations are indicated on the map by a circle and arrow, and although the weather at times was not the most desirable for photography - with the result that some of the aerial and ground photographs taken were not successful - still from a study of the photographs being mailed a general idea of the physical ground features may be obtained.

(Sgd) J.H. Mitchell,
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