

S

B

1555

(907) 465-3900

January 30, 1981

Re: Knik Arm Crossing
Turnagain Arm Crossing

200H-3076/0803

The Honorable Vic Fischer
Senate District E
Alaska State Senate
Pouch V
Juneau, Alaska 99811

Dear Senator Fischer:

In answer to Mr. Sumner Putnam's questions of Mr. Matlock, we are attaching updated estimates of cost (January 1981 dollars) for the Knik Arm and Turnagain Arm Crossings. In the case of the latter, we have updated both the bridge and causeway alternatives which were last studied in 1967 and 1968, but have not included the cost of the connecting roadway to the south.

The shortest route to the Kenai Peninsula would be on new alignment through the national forest and the national moose range (Points M to N to O on the map) although a much shorter initial connection could be made to Hope (M to L to K on the map). If you need cost estimates to include either of these connections, we will develop and furnish them.

In the case of both the Knik and Turnagain Arm Crossings, there would have to be rather extensive studies and coordination with other agencies before final design could actually begin.

We do consider both crossings to be feasible although, admittedly, expensive.

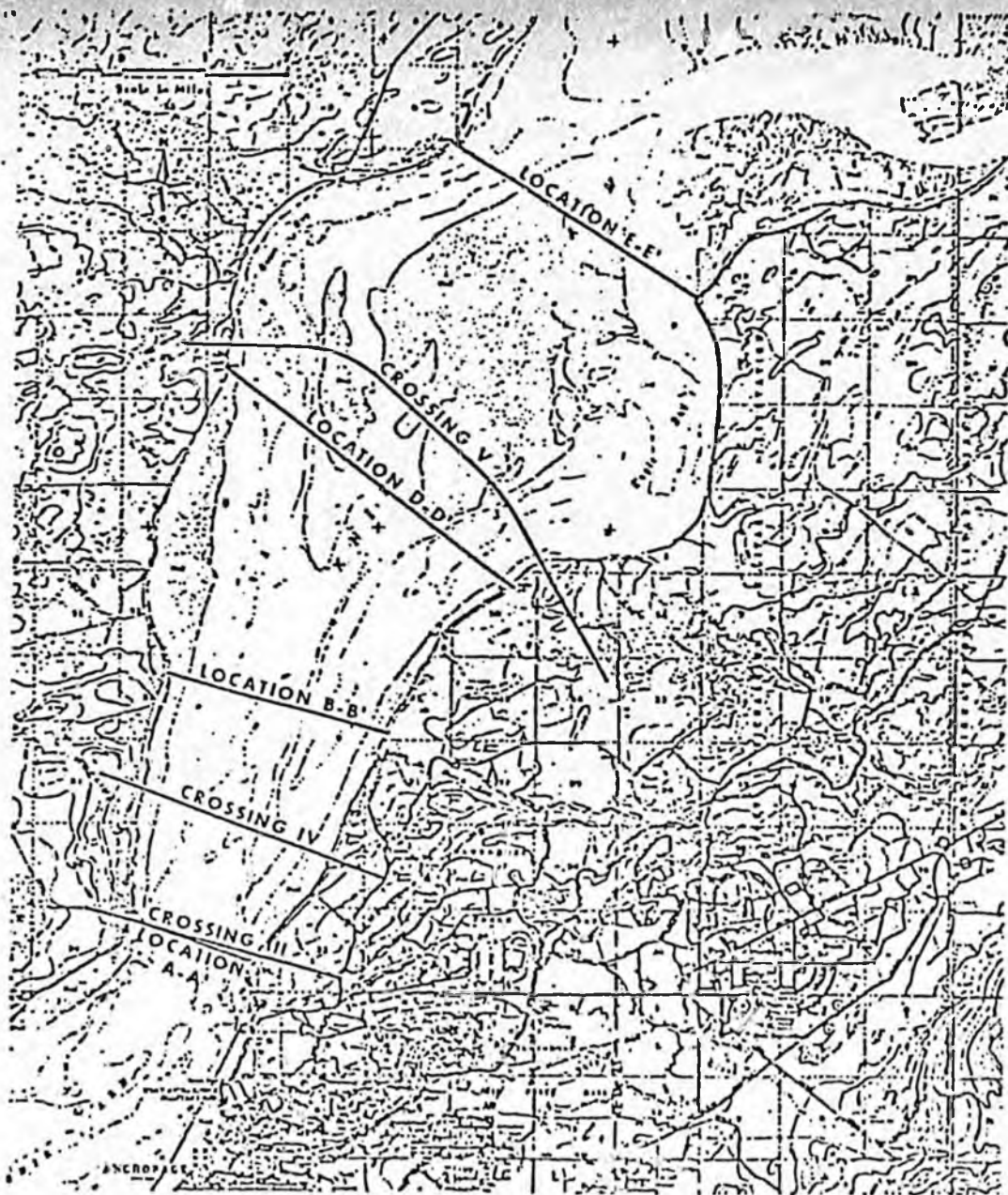
Sincerely,

R. D. Shumway, P.E.
Deputy Commissioner

Attachment

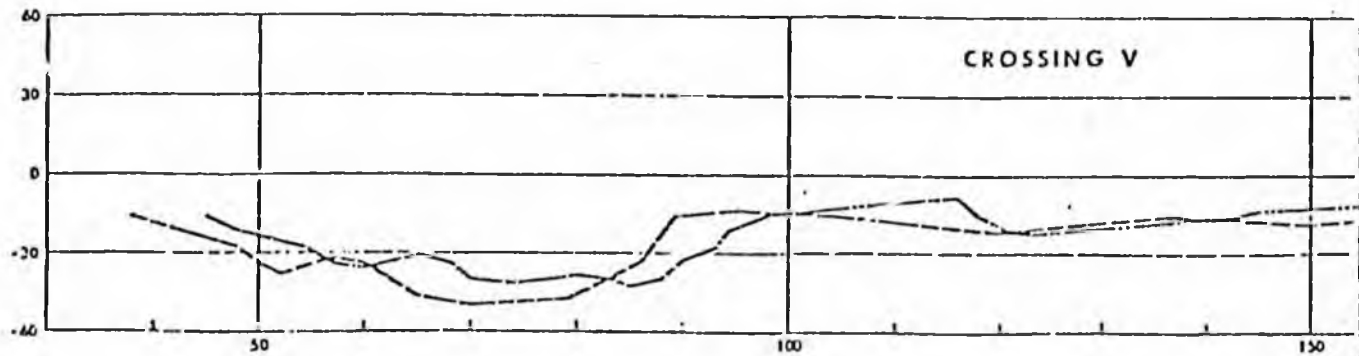
RDS/CSM/kgm

✓ bcc: John Bates
R. D. Redick
Bridge Design
C. S. Matlock



Topographic data on this figure is from U.S.G.S. Quadrangle Maps.

LOCATION MAP



KNIK ARM CROSSING

1/9/81

1971 Estimate

1981 Estimate

	1971 Estimate		1981 Estimate	
	<u>BRIDGE CROSSING IV</u>	<u>CAUSEWAY DAM CROSSING V</u>	<u>BRIDGE CROSSING IV</u>	<u>CAUSEWAY DAM CROSSING V</u>
Total for Crossing	\$114,938,200	\$189,590,600	\$281,598,600	\$464,497,000
Contingencies and Variations (10%)	<u>11,061,800</u>	<u>19,409,400</u>	<u>27,101,400</u>	<u>47,553,000</u>
Estimated Construction Cost *	\$126,000,000	* \$209,000,000	308,700,000	512,050,000
Borings and Soil Testing **	410,000	** 837,000	** 1,004,500	** 2,050,600
Hydrographic and Land Surveys (0.75%)	945,000	1,567,500	2,315,200	3,840,400
Model Testing and/or Test Structure	520,000	225,000	1,274,000	551,300
Engineering and Administration				
Basic Design (4.0%)	5,040,000	8,360,000	12,348,000	20,482,000
Construction Supervision (4.0%)	5,040,000	8,360,000	12,348,000	20,482,000
Administration (1.5%)	<u>1,890,000</u>	<u>3,135,000</u>	<u>4,630,500</u>	<u>7,680,800</u>
Estimated Crossing Cost	\$140,000,000	\$231,000,000	\$343,000,000	\$567,000,000
Estimated Approach Cost			<u>88,000,000</u>	<u>84,000,000</u>
Total Project Cost			\$431,000,000	\$651,000,000

(Based on January 1981 Dollars)

* Based on 1971 start and 1975 finish

** Includes Geophysical Surveys

32' ROADWAY - USING LONG SPANS ONLY

3) SUMMARY - BRIDGE CROSSING - ISLE TO CAPE

CONSTRUCTION COSTS

A. LONG SPAN SUPERSTRUCTURE (18,500')

STEEL	$(175 \frac{1}{2} \text{ lb/ft}^3) (18,500' (34')) \times 1.75 =$	\$192,630,000
CONCRETE	$(34') \times \frac{1}{12} (\frac{1}{2} \times 1) (18,500') \times 500 =$	8,740,000
RESTEEL	$(175 \frac{1}{2} \text{ lb/cy}) (17,500 \text{ cy}) \times .80 =$	2,450,000
JOINTS	$18,500 / 600 = 31 \times \$10,000 =$	310,000
RAILING		240,000
DECK PROTECTION	$18,500' (32') \times \frac{1}{4} \times 15 =$	990,000

\$ 205,360,000

B. LONG SPAN SUBSTRUCTURE

$18,500' / 600' \text{ AVG} = 31 \text{ SPANS} \rightarrow 32 \text{ UNITS}$

SEE SHT. 5 \$4,614,000 (32) =

147,648,000

C. APPROACHES

TOTAL BASIC CONST.

7,440,000

\$ 360,448,000

C. MOBILIZATION @ 1%

3,604,000

D. CONST. ENGR., ADMIN., CONTINGENCIES @ 20%

72,089,000

TOTAL CONST. COST

\$ 436,141,000

PRE-CONST. COSTS

A. R.O.W.

?

B. PRE-ENGR. @ 4% OF 'C CONST. COST =

14,418,000

C. SPECIAL STUDIES (SEE SHT. 7)

7,000,000

\$ 457,559,000

SAY

\$ 450,000,000

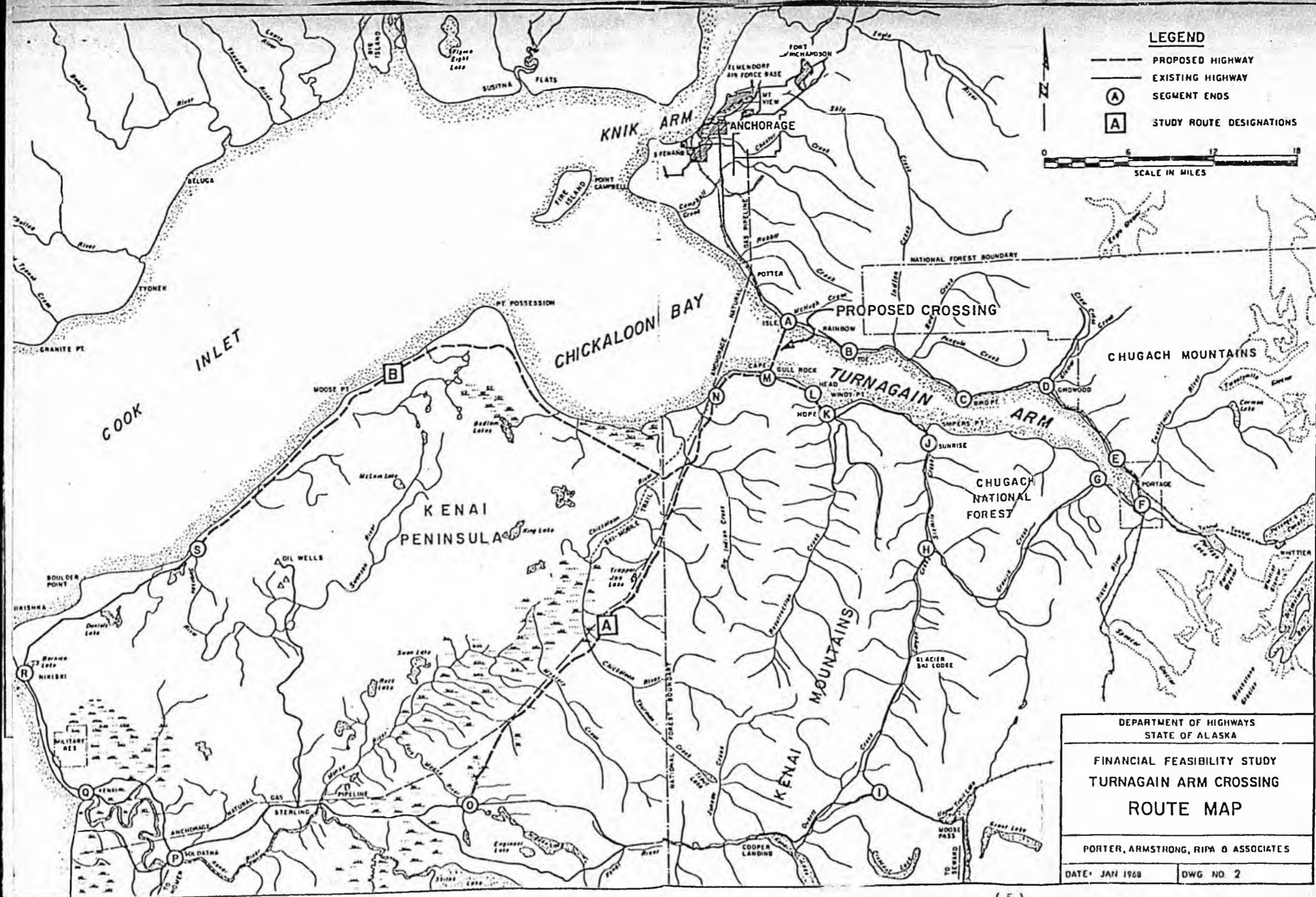
JANUARY, 1981

DOLLARS

II. CAUSEWAY / SPILLWAY - ISLE TO CAPE

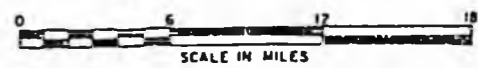
CONST. COST INDICES FROM 1967 TO 1981 GENERALLY REFLECT AN INCREASE OF 300%± FOR THE PERIOD. EARTHWORK ITEMS, IN VOLUMES ESTIMATED, MAY NO LONGER BE AVAILABLE AS CONSULTANT ENVISIONED, SO A FACTOR SOMEWHAT HIGHER IS APPLIED.

ESTIMATED CONSTRUCTION COST	<u>1968</u>	<u>ADJ. FACTOR</u>	<u>1981</u>
End-Dumping Section of Causeway to Elev. 25 — Material in Place			
Quarry-run rock	2,133,000 CY @ \$3.65		\$ 7,785,500
Random material	1,510,000 CY @ 1.65		2,491,500
Armor Rock	501,000 CY @ 11.00		5,511,000
Select Grading Rock	332,000 CY @ 4.00		1,328,000
Seepage Provisions	550,000 CY @ 2.00		1,100,000
	Subtotal		\$18,216,000
		x 5.0 =	\$ 91,080,000
Barge-placed Material (including Island) — Material in Place			
Selected sand and gravel, talus, or quarry fines			
	880,000 CY @ \$4.30		\$ 3,784,000
Quarry-run rock	2,500,000 CY @ 5.30		13,287,000
Random material	1,740,000 CY @ 3.30		5,765,000
	Subtotal		\$22,836,000
		x 5.0 =	114,180,000
Cableway Placed Closure Section — Material in Place			
Select Quarry Rock	1,400,000 @ \$5.50		\$ 7,700,000
Quarry medium to fine	1,400,000 @ 4.20		5,880,000
	Subtotal		\$13,580,000
		x 5.0 =	67,900,000
Completion of Causeway — Above Elev. 25 — Material in Place			
Random material	600,000 CY @ \$1.65		\$ 990,000
Armor riprap	262,000 CY @ 11.00		2,882,000
Select filter material	98,000 CY @ 4.00		392,000
	Subtotal		\$ 4,264,000
		x 5.0 =	21,320,000
Roadway Across Causeway			
Pavement, including subbase			
	19,500 Lin. Ft. @ \$22.80		\$ 445,000
Guard rail — in place	40,000 Lin. Ft. @ 9.50		380,000
	Subtotal		\$ 825,000
		x 3.0 =	2,475,000
Spillway			
Concrete Control Wall —			
Excavation	1,000 CY @ \$20.00		\$ 20,000
Concrete in Place	1,000 CY @ 100.00		100,000
Special Shaping	Lump Sum		100,000
Fish Ladder	Lump Sum		700,000
Highway Bridge —			
Structural Steel	1,550,000 lb. @ \$ 0.40		520,000
Concrete	1,762 CY @ 200.00		352,000
Re-steel	283,000 lb. @ 0.20		57,000
Bridge rail	2,180 ft. @ 8.00		17,000
Caissons	Lump Sum		51,000
	Subtotal		\$ 1,917,000
		x 3.0 =	5,751,000
Estimated Construction Cost — Causeway, Roadway & Bridge (without RR bridge)			61,638,000
Contingencies — 20%			12,328,000
			\$73,966,000
Engineering & Administration — 15%			11,094,000
TOTAL ESTIMATED COST —			85,060,000
	Say		\$85,000,000
		+20%	\$ 302,706,000
		+15%	60,541,000
			\$ 363,301,000
			54,495,000
			\$ 417,796,000
		SAY	\$ 420,000,000



LEGEND

- PROPOSED HIGHWAY
- EXISTING HIGHWAY
- (A) SEGMENT ENDS
- [A] STUDY ROUTE DESIGNATIONS



DEPARTMENT OF HIGHWAYS
STATE OF ALASKA

FINANCIAL FEASIBILITY STUDY
TURNAGAIN ARM CROSSING
ROUTE MAP

PORTER, ARMSTRONG, RIPA & ASSOCIATES

DATE: JAN 1968 DWG NO 2



Alaska State Legislature

Senator Vic Fischer • Pouch V • Juneau, Alaska 99811 • (907) 465-4954

MEMORANDUM

TO: Sen. Bill Ray, Chair
Senate Transportation Committee

FROM: Sen. Vic Fischer *VF*

DATE: March 12, 1982

RE: SB 155, Turnagain Arm Crossing

I am extremely interested in having at least some funds allocated to DoTPF to do at least a minimal reconnaissance study of a Turnagain Arm Crossing as soon as possible. I truly believe this can be a most important project for the Railbelt's economic development.

North Kenai, on the western side of the peninsula, already has a number of major industrial facilities. It is the logical area for industrial development in the whole region around Anchorage. A proper highway connection and rail access are crucial to realizing both the potentials of industrial development on the Kenai and relieving pressure on industrial development in Anchorage itself.

Recreation is another major factor. Many urban Anchorageites use the Kenai Peninsula for recreation, especially the Kenai River area and Kachemak Bay. The need for decent access to these areas is tremendous. The existing Seward Highway simply cannot accommodate the regular traffic on summer weekends, and situation will simply get worse in the future. I'm sure it will cost us many times more to improve road access via the circuitous route around Turnagain Arm and the mountainous road over the peninsula than it would to provide a virtually sea level route across Turnagain Arm and an alignment across the Kenai generally following the existing gas pipeline.

While I certainly don't want to take anything away from Seward, I'm sure that the long-term development of the state would be tremendously served by having a railroad and road providing direct access to the western Kenai Peninsula. Moving SB 155 might be a small step in that direction.

Thanks for your consideration.

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT

MEMORANDUM

TO: Senator Vic Fischer
FROM: Senator Bill Pay, Chairman
Committee on Transportation
DATE: March 11, 1981
RE: SB 155, Turnagain Arm Crossing

I am in receipt of your correspondence of March 5 and enclosed
letter from Harold Pomeroy concerning the above mentioned subject.
Thank you for providing me with this information.



Official Business

Alaska State Legislature

Senate

Pouch V
State Capitol
Juneau, Alaska 99811

M E M O R A N D U M

TO: SENATOR BILL RAY, CHAIRMAN
SENATE TRANSPORTATION COMMITTEE

FROM: SENATOR VIC FISCHER *VF*

DATE: MARCH 5, 1981

RE: SB 155, Turnagain Arm Crossing

Attached is copy of a letter from Harold Pomeroy. Among other things, he suggests that a preliminary reconnaissance should precede the proposed \$2 million study that I proposed.

While I'm extremely interested in seeing some progress on this project, I will leave it to you how intensive a program should be initiated.

Thanks for your consideration of this project.

HAROLD E. POMEROY

Swift Water

~~BOX 777 -- SOLDOTNA, ALASKA 99669 --~~
4048 Wright St., Anchorage 99504

Senator Vic Fischer
Pouch V
Juneau, Alaska 99811

February 11, 1981

Dear Vic

This refers to an article in the Anchorage Daily News, 2/5/81, quoting you.

It seems to me that there is not an adequate justification for another Turnagain Crossing study. The engineering data from past studies is not obsolete. There was also an economic feasibility study about 1965.

A little preliminary inquiring might confirm that the \$2,000,000 proposed cost would be a wasted expenditure. Would it not be good sense to spend a few thousand dollars, maybe only three or four, to review all the data on the crossing and study a digest of this information before going further?

It could be quite worthwhile to consult with three or four of the most knowledgeable executives of the petroleum industry; they might have very valuable observations. Consultations in other directions might also be useful.

U
As a general proposition I believe preliminary reconnaissance is an inexpensive tool that can frequently be used to indicate a subject should be pursued no further or that it merits exhaustive investigation - or some third course.

Of this I am convinced: We are shortchanging ourselves by not taking advantage of the great amount of information and experience that "practicing Alaskans" have to contribute on many subjects.

To illustrate: A \$50,000 or \$60,000 study of a proposal to settle Cambodian refugees in "self-contained" agricultural settlements was being enacted by the Legislature. I suggested to Mike Miller the idea that consulting a few veteran Alaskans might be useful and save money. He was enthusiastic. I gave him the names of five veteran Alaskans, who had homesteaded, done agriculture and were presently active in Alaskan affairs - and had no axe to grind. These people had a combined residence in Alaska of 127 years. They would have come to Juneau - or Anchorage - at no cost except actual expenses, and spent two or three days to compare experiences and draft their estimate of the feasibility of the refugee settlement idea.

This must have been too simple. The next I heard, a girl from Juneau was being sent to Ohio to see how some refugees were doing there!

Senator Vic Fischer
February 11, 1981

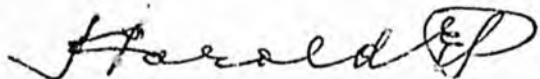
page 2

Your reference to a railroad recalls a speech before the Chamber of Commerce here in which David Reaume said we should modernize transportation to the Kenai Peninsula, including a railroad. But there wasn't a word about the economic development to follow which would justify the railroad. You could ask a half dozen persons knowledgeable about the Anchorage - Kenai Peninsula area, plus a railroad person, to lunch and learn in two hours that there isn't any - and why.

As to agriculture: There are tens of thousands of vacant acres on the Kenai Peninsula once occupied by hopeful homesteaders in the 50's and 60's. Agriculture on the Kenai Peninsula is negligible due to major competitive disadvantages we can do very little about.

The proposed \$2,000,000 crossing study is a good example from which to urge that we draw on what we do know - that we take advantage of a lot of solid knowledge in various fields among "practicing Alaskans", and look in the files, too. It might surprise us to find the number of times we don't have to re-invent the wheel.

Warm personal regards,

A handwritten signature in cursive script, appearing to read "Harold P." with a stylized flourish at the end.

HEP/rsp

**PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.**

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT

February 3, 1981

MEMORANDUM

SB 155

TO: Interested Parties

FROM: Sen. Vic Fischer

RE: Turnagain Causeway crossing and hydroelectric facility

The proposed Turnagain Causeway crossing and hydroelectric project has not been determined to be feasible, and this appropriation is for the study and sample piling test to enable design engineers to make that determination. The route of the crossing, construction materials, hydroelectric potential and cost of the project are as yet unknown and will be determined by the study authorized by this bill.

DOTPF estimates 2 to 4 years to complete this study.

Some advantages of such a crossing are:

- 1) Shortened mileage between Anchorage and Kenai by approximately one hundred miles.
- 2) Enormous hydroelectric generation potential.
- 3) Relief for the dangerous traffic situation on the Seward Highway.
- 4) Access to prime recreational, residential and agricultural land in the Pt. Possession area.
- 5) Provide a roadbed for possible extension of the Alaska Railroad down the west side of the Kenai Peninsula.



Official Business

Alaska State Legislature

Senate

Committee on State Affairs

Pouch V
State Capitol
Juneau, Alaska 99811

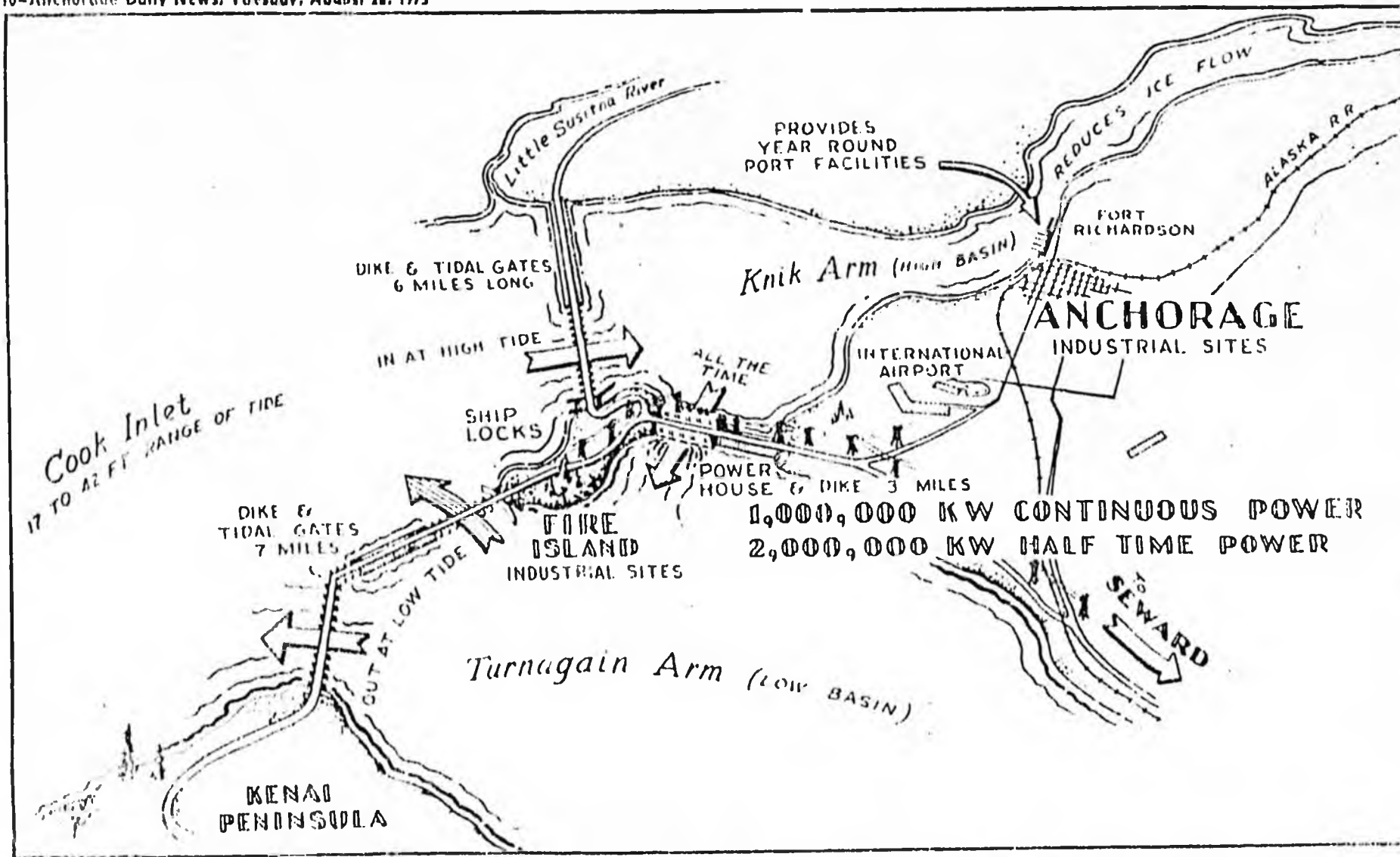
M E M O R A N D U M

TO:

FROM: Sen. Fischer

RE: Cook Inlet Tidal Power and Transportation Links

Attached is an Anchorage News clipping of August 26, 1975, that gives us all the answers to providing Turnagain Arm and Knik Arm crossings from Anchorage, harnessing Cook Inlet tides, etc. The proposal looks like it would solve many of our problems: power, highway access, port, etc.



A plan to build dikes across Knik and Turnagain Arms to harness the tidal power of Cook Inlet was first

proposed more than 20 years ago by a Seattle consulting engineer, Roy Johnson. The proposal is gaining

new attention as natural gas and oil prices climb; the nation searches for alternative sources of energy.

Electricity from steam, winds, tides

By ROSLMARY SHINOHARA
Daily News Staff Writer

By 1980, Alaska may be getting about 90 per cent of its electrical energy from oil and natural gas, says R. J. Cross, chief of the project development division for the Alaska Power Administration.

"This is a matter of no small concern," Cross says. "There are good reasons to try to reverse the trend."

ROY W. JOHNSON, a Seattle consulting engineer, and Dr. William Ogle, an energy consultant, agree. But each has different ideas on how Alaska's power needs can be met, ranging from a proposal to harness the tides in Cook Inlet to prospects for supplying power for the village of Elim with a hot springs about seven miles away.

All three men made presentations on alternative energy sources before delegates to the Construction Specifications Institute regional convention, which ended in Anchorage Sunday.

HYDRO POWER

Cross says there's a good chance that Alaska's major power systems may be placed entirely on coal and a hydro energy basis by the middle or late 1980s.

THE CONVERSION to hydro and coal power is "A very real option," but it would require huge investments, Cross says.

"Building Devil Canyon and the other units of the Upper Susitna River Project would be a major step," he believes. The

Devil Canyon project alone would provide roughly one-fourth of the total estimated Alaska energy requirements in the year 2000. The U.S. Corps of Engineers is now completing field studies, with plans to have the first power on line in 1985 and annual firm energy of more than six billion kilowatt hours when the project is totally developed.

The Alaska Power Administration, part of the Interior Department, primarily plans for water and power development and operates federal hydroelectric projects in the state, but has also made some studies of coal, Cross says.

PLANS to export coal from the Cook Inlet area to the South 48 have been under active consideration for several years, he notes. "Huge increases in coal prices over the past two years have certainly enhanced chances for such development."

GEOHERMAL ENERGY

Dr. William Ogle, a physicist, has studied both geothermal energy and wind power, and says Alaska apparently has very large geothermal resources, but little is known about them.

There are generally three types of geothermal energy, dry steam, hot water, and hot, dry rock, Ogle says. For dry steam, the steam can be piped out of the earth and run through a turbine to create cheap electricity. With a hot water resource, steam and

water will come to the surface if a hole is drilled down to the hot water. The experts are still studying how to produce energy from hot rock, where no water exists.

Ralph Stefano, an Anchorage engineer, studied the feasibility of heating Nome with a piping system from the Pilgrim Hot Springs some 70 miles away. The piping system is estimated to cost \$35 million. But another possibility might be to drill directly under Nome in search of a geothermal resource similar to the system used to furnish utilities for large apartment complexes in Paris, Ogle says.

The University of Alaska is looking at another potential geothermal project — a power system for the village of Elim east of Nome, with a hot spring

about seven miles away.

TIDAL POWER

Roy Johnson, a consulting engineer, first presented his proposal to provide power for the Cook Inlet area in 1954 — and with electricity needs rising along with costs, his plan to harness the tidal energy in Cook Inlet may be reasonable and competitive in 1975, Johnson believes.

Johnson's plan calls for damming Knik and Turnagain arms, enabling power to be produced because of the difference in water surface elevation on either side of the dike.

THE PROJECT would include vehicle access from Anchorage across Turnagain Arm to the Kenai Peninsula and across Knik Arm to the Susitna River delta. Other

possible benefits would be the potential for establishment of a complex of electro-metallurgical and electro-chemical industries to process minerals with the tidal power, Johnson says.

An extensive program of investigation would have to be pursued to authoritatively determine the feasibility of the idea, he says. He suggested the cost of tidal barriers and gates might be \$500 million, and the cost of a power plant might be \$500 million for a 1,000 megawatt plant.

Even with those figures, the cost-to-benefit ratio for the project would be high, Johnson says. Direct highway routes on the barriers, improvements to shipping, and the non-polluting nature of the project are among its benefits.



the draft comprehensive plan

Quote; Page 10

"Citizens throughout the Borough have repeatedly voiced a concern over inadequacies in the design of many residential subdivisions . . . The mixing of single family homes with apartment units, however, did not receive much support."

Page 21, Policy # 2

"The housing industry should be encouraged to provide greater sub-



**PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.**

M E M O R A N D U M

TO: SENATOR BILL RAY, CHAIRMAN
SENATE TRANSPORTATION COMMITTEE

FROM: SENATOR VIC FISCHER

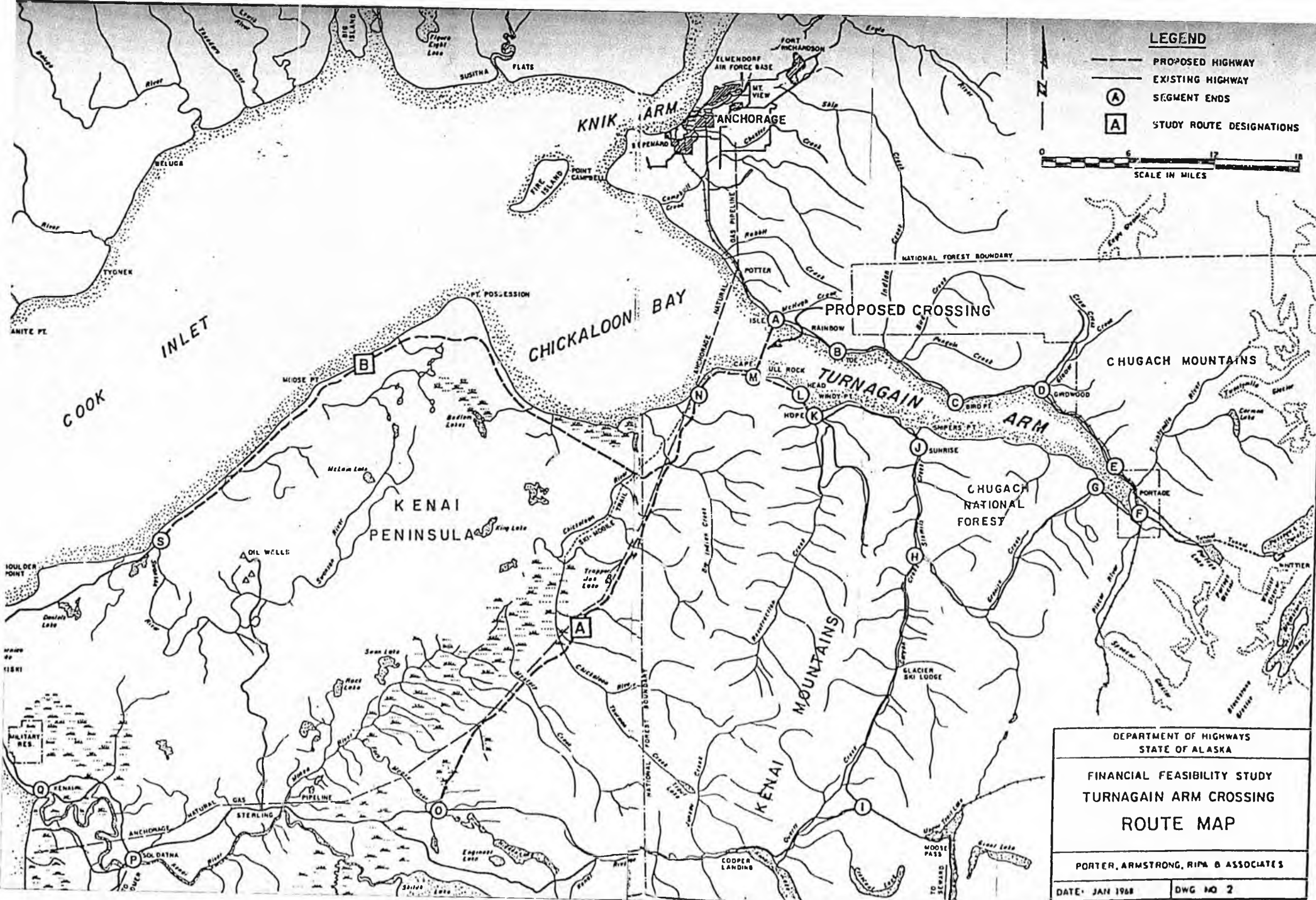
DATE: MARCH 5, 1981

RE: SB 155, Turnagain Arm Crossing

Attached is copy of a letter from Harold Pomroy. Among other things, he suggests that a preliminary reconnaissance should precede the proposed \$2 million study that I proposed.

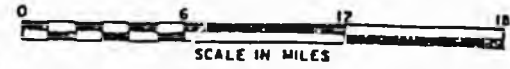
While I'm extremely interested in seeing some progress on this project, I will leave it to you how intensive a program should be initiated.

Thanks for your consideration of this project.



LEGEND

- PROPOSED HIGHWAY
- EXISTING HIGHWAY
- (A) SEGMENT ENDS
- [A] STUDY ROUTE DESIGNATIONS

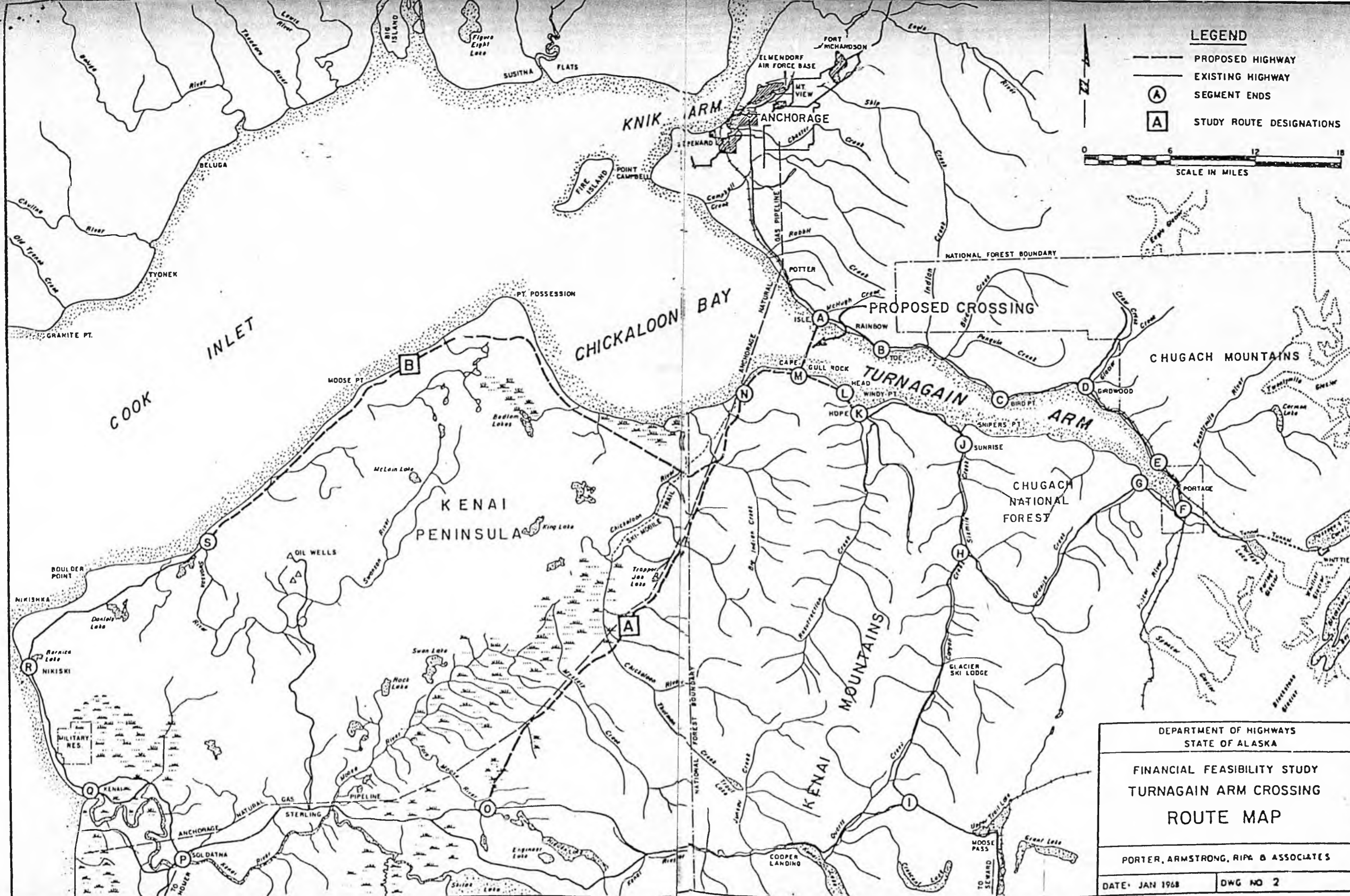


DEPARTMENT OF HIGHWAYS
STATE OF ALASKA

FINANCIAL FEASIBILITY STUDY
TURNAGAIN ARM CROSSING
ROUTE MAP

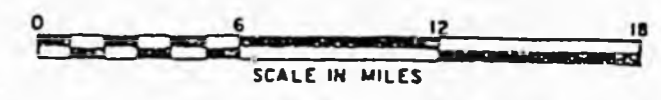
PORTER, ARMSTRONG, RIPA & ASSOCIATES

DATE: JAN 1968 DWG NO 2



LEGEND

- PROPOSED HIGHWAY
- EXISTING HIGHWAY
- (A) SEGMENT ENDS
- [A] STUDY ROUTE DESIGNATIONS



DEPARTMENT OF HIGHWAYS STATE OF ALASKA	
FINANCIAL FEASIBILITY STUDY TURNAGAIN ARM CROSSING ROUTE MAP	
PORTER, ARMSTRONG, RIPA & ASSOCIATES	
DATE: JAN 1968	DWG NO 2