

FRIDAY MAY 29 1931

REPORT OF THE COMMISSION

APPOINTED TO
INQUIRE INTO THE MATTER OF

SECOND NARROWS BRIDGE
BURRARD INLET, B.C.

DEPARTMENT OF MARINE

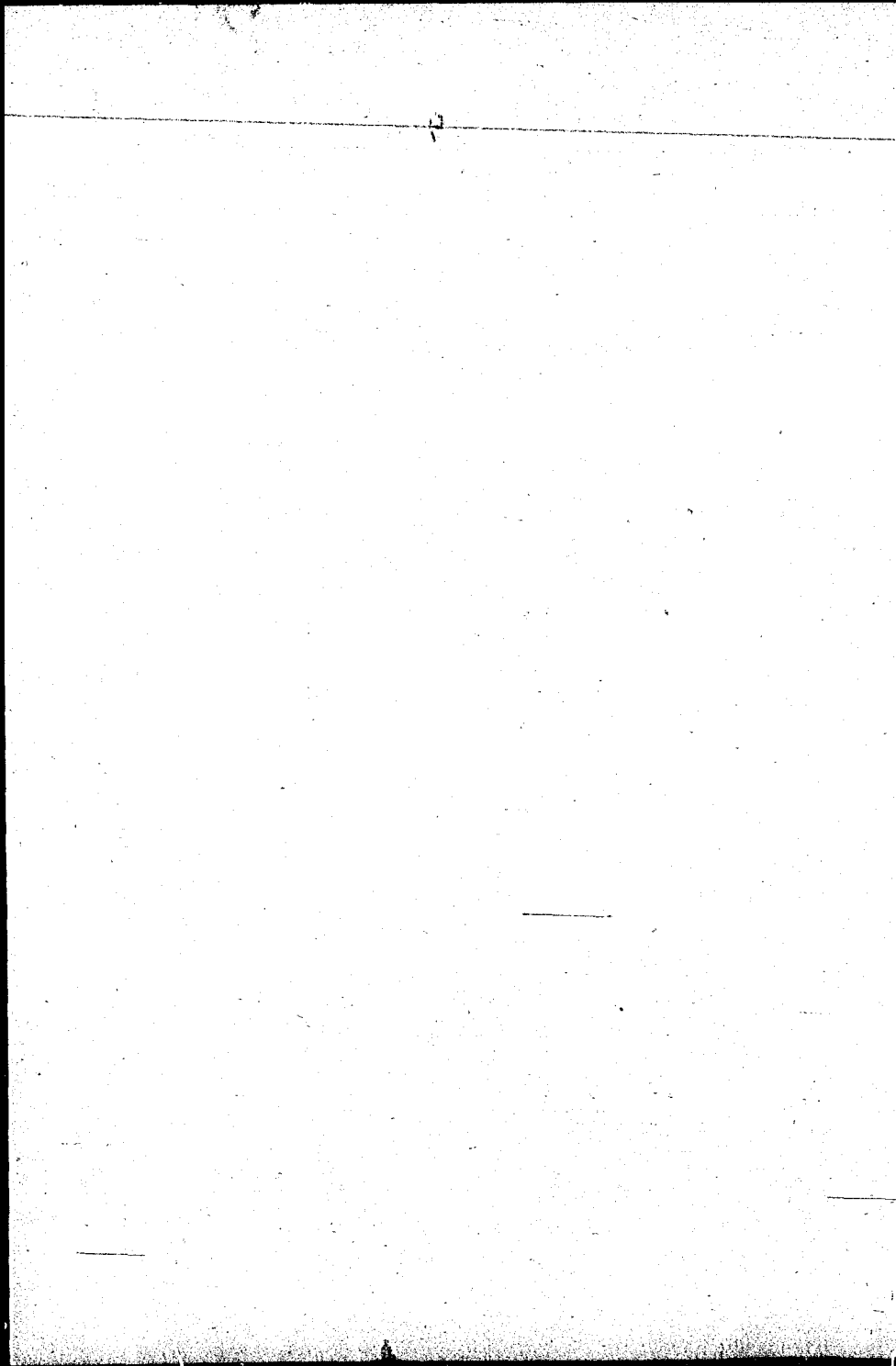
COMMISSIONERS:

Mr. L. E. Côté (Chairman) Dr. E. E. BRYDONE-JACK
Mr. C. E. CARTWRIGHT

FEBRUARY 24, 1931



OTTAWA
F. A. AGLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1931



OTTAWA, March 7, 1931.

To the Honourable
ALFRED DURANLEAU, K.C., P.C.,
Minister of Marine,
Ottawa.

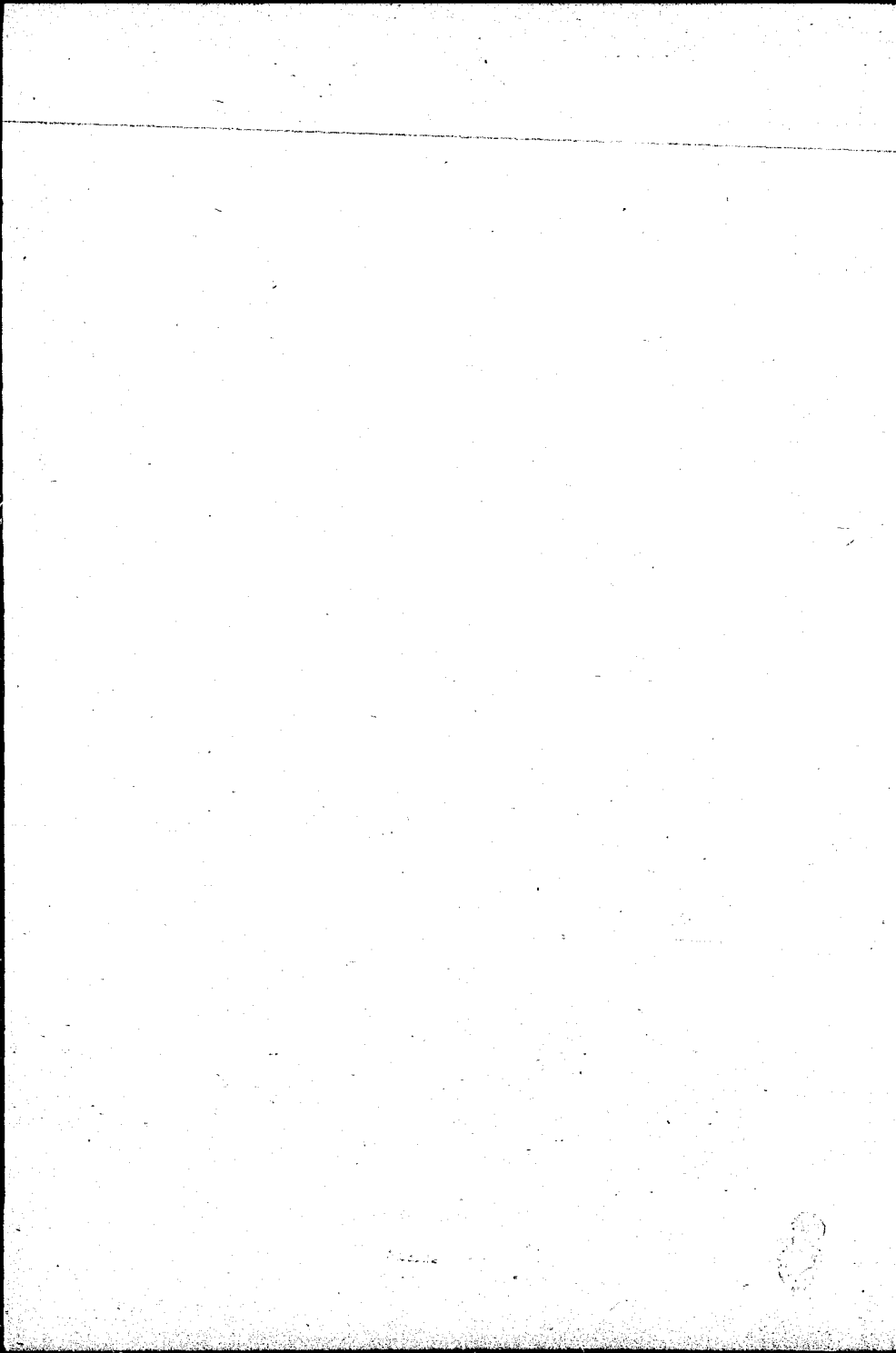
SIR:

Re Second Narrows Bridge, Burrard Inlet, B.C.

I have the honour to transmit to you the Report of the Commissioners appointed to inquire into the above matter.

I have the honour to be, sir,
Your obedient servant,

LOUIS E. CÔTE
Chairman.



RE SECOND NARROWS BRIDGE, BURRARD INLET, B.C.

The Honourable the Minister of Marine,
Ottawa, Ontario.

INSTRUCTIONS TO COMMISSION

HONOURABLE SIR,—The commission which was appointed by an order of the Governor General in Council bearing date the thirteenth day of December, 1930 (P.C. 2908), to inquire into and report as to the best manner of safeguarding navigation as well as of providing for suitable connection between Vancouver and North Vancouver at the Second Narrows, Burrard Inlet, B.C., has the honour to submit the following report:—

PUBLIC HEARINGS

In order to allow the full expression of opinions from both public bodies and from any persons interested, public hearings were held in Vancouver on January 12, 13, 14 and 15, 1931. Notice of these public hearings were advertised in the daily press of the city of Vancouver.

All municipal bodies, Board of Trade, shipping interests and industrial interests that might wish to present their views were also notified by letter of the public hearings.

Transcript of the evidence given at these public hearings and summary of same is attached to this report as Appendix I. Your commissioners wish to record their full appreciation of the cheerfulness and willingness displayed by the many witnesses who appeared before them, in testifying, as well as the apparent desire to acquaint the commission with all information, and for the assistance they have given in every respect.

GENERAL DESCRIPTION

A map of Vancouver Harbour prepared by the Vancouver Harbour Commissioners is attached to this report as Appendix II.

This map shows English bay, Burrard inlet, cities of Vancouver, North Vancouver and Port Moody, district of North Vancouver, municipalities of West Vancouver and Burnaby where they border on Burrard inlet.

Burrard inlet is a large inlet extending from the First narrows (or English bay) in an easterly direction for approximately twelve (12) miles to Port Moody.

At a point roughly eight (8) miles east of the First narrows the North arm extends in a northerly direction for a distance of approximately twelve (12) miles.

The total water surface in Burrard inlet is approximately twenty-eight square miles.

At a point about four and one-half miles east of the First narrows, the Inlet narrows to a channel about 900 feet wide at low water, and this is known as the Second narrows.

The Second narrows may thus be regarded as dividing Burrard inlet into large bodies of water, namely:—

- (1) The body of water between the First and Second narrows approximately eight (8) square miles in area, and;
- (2) The body of water lying to the east and north of the Second narrows, approximately twenty (20) square miles in area.

The total shore line of Burrard Inlet will be at least fifty (50) miles in length.

CITIES AND MUNICIPALITIES ON SOUTH SHORE

On the south shores of Burrard inlet are the cities of Vancouver and Port Moody and the municipality of Burnaby while the city of New Westminster may also be regarded as tributary from the viewpoint of communication.

CITIES AND MUNICIPALITIES ON NORTH SHORE

On the north shores of Burrard inlet and English bay are the city of North Vancouver, the district of North Vancouver, the municipality of West Vancouver and the company-town settlement of Dollarton.

Tributary to the north shore are summer resorts along the north shore of English bay, Horseshoe bay, Whytecliff and Deep cove, Crouse mountain and Hollyburn ridge.

There are excellent scenic highways to these resorts.

The territory north of Burrard inlet and English bay and west of the North arm of Burrard inlet is entirely dependent for communication with the outside world on the ferry service of West Vancouver and North Vancouver and on the highway and railway bridge over the Second narrows. At present the bridge over the Second narrows is out of commission, due to the destruction of the 300 foot span and the prevention of its renewal by the decision of the Privy Council in the case of the Burrard Inlet Tunnel and Bridge Company versus the ss. *Eurana*.

Statistics in reference to population, assessed value of lands, industries, etc., are attached to this report as Appendix III. The following is a summary showing totals on the north and south shores:—

TOTALS OF STATISTICS

	North Shore	South Shore
Population	26,000	400,000
Assessed value of lands . . . \$	35,000,000	\$400,000,000
Industries, capital invested . .	22,000,000	200,000,000

Between the First and Second narrows the south shore of Burrard inlet, as can be seen by the map of Vancouver Harbour, Appendix IIIA, is pretty well occupied, but on the north shore there are large areas suitable for industrial and harbour development in the vicinities of the First and Second narrows.

With proper transportation facilities, the traffic between the north and south shores will increase very rapidly due to the expansion of industries, development of pleasure resorts as well as the general tourist traffic.

TRAFFIC BETWEEN NORTH AND SOUTH SHORES

The approximate annual traffic between the north and south shores carried by West Vancouver ferries, North Vancouver ferries and the Second Narrows bridge before the bridge was put out of commission was as follows:—

Annual vehicular traffic	1,250,000
Annual passenger traffic	6,430,000
Annual rail traffic (railway cars)	10,000

The summer traffic is very much heavier than the winter traffic, the monthly maximum found being approximately:

Maximum monthly vehicular traffic..	165,000
Maximum monthly passenger traffic..	740,000
Maximum monthly railway cars..	3,650

Holiday traffic is heavy, the maximum daily on a holiday being about 8,000 vehicles and 25,000 people.

DETAILS IN APPENDIX

Detailed statistics in reference to the various cities and municipalities in regard to populations, assessments and industries as well as detailed statistics in reference to traffic between the North and South shores will be found in Appendix IV.

EAST AND WEST TRAFFIC

In addition to the traffic between the north and south shores there is a water-bourne traffic passing through the Second narrows to industries and districts located east of the Second narrows.

The combined highway and railway bridge at the Second narrows (which carried a good proportion of the north and south traffic) formed a considerable obstruction to the East and West waterbourne traffic.

The total number of vessels passing through the Second narrows annually is about twenty-two thousand (22,000) of which about four thousand five hundred (4,500) require the opening of the lift span in the bridge.

In certain months of the summer the number of vessels passing amounts to approximately two thousand four hundred (2,400) vessels per month of which about three hundred and seventy (370) require the opening of the lift span.

As the larger deep-sea vessels only pass through the Second narrows at slack water, and preferably at high water slack, it can readily be seen that the east and west traffic was restricted for the larger vessels to about two hours per day.

BRIDGE AT SECOND NARROWS

A plan showing the spans and clearances of the Second narrows bridge is attached to this report as Appendix V.

It will be noted that the bridge provides a clearance of twenty-two (22) feet above high water level under its fixed spans and a bascule lift span near the south shore which provides a clear opening of one hundred and sixty-five (165) feet for navigation when raised.

The history of the Second narrows bridge with financial and other data is given in Appendix VI.

It will be noted that the original cost of the bridge was in the vicinity of two million dollars (\$2,000,000) including cost of preparatory work.

FINANCES OF BRIDGE

The bridge was financed by cash payments of stock, eight hundred thousand dollars (\$800,000), bond issues guaranteed by the city and District of North Vancouver to the extent of seven hundred thousand dollars (\$700,000), Domin-

ion and provincial grants to the extent of about three hundred and ninety thousand dollars (\$390,000) and a loan of about one hundred thousand dollars (\$100,000) from the Vancouver Harbour Board.

The shareholders are:—

(1) The District of North Vancouver.. . . .	\$287,500
(2) The City of North Vancouver.. . . .	250,000
(3) The City of Vancouver.. . . .	200,000
(4) The District of West Vancouver.. . . .	62,500

For the years 1925, 1926 and 1927 there was a total loss of \$42,211.68 but for the years of 1928 and 1929 there was a profit of \$55,526.80 and a dividend of 3 per cent was paid to the shareholders.

RECEIPTS AND EXPENDITURES

The daily average cost of operation in 1929, including interest on bonds, depreciation, operation and maintenance was \$453.11, as against an average daily revenue of \$553.50.

Since the 300 foot fixed span was wrecked by the *Pacific Gatherer* on September 19 no revenue has been derived from the bridge.

MARINE ACCIDENTS IN SECOND NARROWS, DUE TO BRIDGE

A complete list of all cases where vessels or booms, etc., have come in contact with the bridge at the Second narrows is given in Appendix VIA.

In the great majority of cases there has been either no damage or very slight damage.

There have been six (6) accidents to deep-sea vessels since the bridge was constructed in 1925, according to the list in Appendix VIA. Of these, the heaviest damages were caused by the following four vessels:—

Year	Vessel
1927.. . . .	SS. <i>Eurana</i>
1928.. . . .	SS. <i>Norwich City</i>
1930.. . . .	SS. <i>Losmer</i>
1930.. . . .	Hulk <i>Pacific Gatherer</i> in tow of tug <i>Lorne</i>

As a result of the accidents in which both the ss. *Eurana* and the bridge were damaged, suit was brought by the Burrard Inlet Tunnel and Bridge Company for damages against the owners of the ss. *Eurana*. The owners of the ss. *Eurana* brought in a counter claim for damages of about \$77,000 to the vessel.

The case was tried in the Admiralty Court before Judge Martin who dismissed both claim and counter claim. On appeal this judgment was upheld in the Exchequer Court by Judge MacLean.

PRIVY COUNCIL DECISION

The case was then appealed to the Privy Council in England, and the following is a quotation from the judgment given by the Privy Council:—

"The Special Act which constitutes the Bridge Company and confers upon them the power to construct and maintain the bridge limits the power by the express condition that the bridge is not to interfere with navigation. This stipulation in favour of public rights controls the whole activities of the company. It is absolute and it cannot be supposed that the incorporation of provisions of a General Act implied the intention of the legislature that nevertheless the bridge might interfere with navigation if the Railway Board so permitted

" . . . Their Lordships, therefore, are of opinion that the defendants have suffered damage by reason of the construction and maintenance by the Bridge Company of a substantial interference with navigation amounting to a public nuisance for which the defendants have no statutory authority."

According to the judgment it would appear that the Burrard Inlet Tunnel and Bridge Company would be liable for damages in all cases where damage or delay had been caused by the bridge.

The judgment is based largely upon the fact that the Special Act constituting the Bridge Company confers upon the Bridge Company the power to construct and maintain the bridge under the express condition *that it is not to interfere with navigation.*

This condition strictly interpreted would mean that no structure could be put across the Second narrows unless it gave a clear span between high water marks and a vertical clearance sufficient to clear the masts of the tallest vessels.

METHODS OF IMPROVING NAVIGATION

In considering any method or scheme for improving navigation through the Second narrows, as well as affording adequate communication between the North and South shores, it is evident that if possible the present investment of two million dollars (\$2,000,000) should not be scrapped but should be utilized as far as possible in order to relieve the burden of the Cities and districts which are shareholders as well as guarantors of the bonds.

It is also evident that if possible any improvement should be carried out so that there will be some return on the investment. It is also evident that any feasible means of communication between the north and south shores via the Second narrows must cause some interference to navigation, but the object is to provide the least possible interference either to navigation or to land communication between the north and south shores; and it is assumed that any Special Act or Enabling Act authorizing the construction of a structure across the Second narrows will make due provision for the determination of what may be regarded as a reasonable or unreasonable interference with navigation.

Your commission feel that they have a plan which will provide adequately both for navigation and for highway and rail traffic without undue interference with each other.

During the enquiry a great many and widely different proposals, with various degrees of merit, were submitted by engineers and others to either improve the present structure or to scrap it altogether.

These proposals are attached in Appendix VII. They may be arranged in various groups as follows:—

- (1) Proposals for the construction of a dam or causeway across the Second narrows with locks to take care of navigation and involving the scrapping of the present structure.
- (2) Proposal for the construction of a short canal with light-lock gates for locking ships; this does not involve damming the Second narrows or eliminating the present structure.
- (3) Proposals for changes in the present structure by additions of bascule or vertical lifts.
- (4) Proposals for tunnels.
- (5) Proposals to dam the north arm of Burrard inlet.
- (6) Miscellaneous proposals.

GENERAL DESCRIPTION OF RECOMMENDED PLAN

The essential features of the plan recommended by this commission are:—

(a) The construction of a canal without locks and of dimensions ample for the largest class of ships, on the north side of the inlet, of a sufficient length to reduce the gradient between the quiet waters of the Upper and Lower basins so that the maximum velocity of current through it at any time will not interfere with the safe passage of ships.

(b) The construction of a new channel for Seymour and Lynn creeks, directing their waters to the west.

(c) The relocation of the railway and highway north of Second narrows bridge to cross the proposed canal and creek diversion at right angles with a swing-bridge over the canal and fixed spans over the creek diversion and Lynn creek.

(d) The utilization of the present bridge across the Second narrows, after the reconstruction of the wrecked span, without change other than that of discontinuing the use of the bascule span for the passage of ships.

(e) The creation of exceedingly valuable industrial sites and harbour facilities by the reclamation of tidal flats. The reclamation is made by utilizing the material dredged from the canal and from the north side of the Second narrows.

The installation of the necessary facilities, such as roadway, water supply and rail communication on the industrial island thus formed and the acquirement of any adjoining lands advisable for industrial development would allow the reclaimed land to be leased.

The rentals from the leased land will provide an amount greatly in excess of the requirements for interest and sinking fund on the proposal.

A general plan showing these recommendations is included as Appendix VIII.

This shows a canal, 2.5 miles in length, the centre line of which extends in a straight line from the angle in the Vancouver Harbour Commissioners Pier Head Line in line with the westerly boundary of East Seymour Indian Reserve No. 3 to a point 2,650 feet south of a point in the southerly boundary of Third street, in the city of North Vancouver, midway between Hendry and Konnard avenues.

From surveys, gauge readings and current observations made by the Hydrographic Survey under supervision of Messrs. Parizeau and Hayden over a period during which tides approaching the maximum for the year occurred, the maximum head to be overcome in the length of the canal was found to be not more than 1.5 feet which we find will not create a velocity of current in the canal during maximum tides exceeding three knots per hour.

In a straight channel, not subject to cross-currents, this will not cause any menace or delay to navigation.

This maximum will only be reached on a few tides in the year, occurring near midwinter and midsummer. On 296 days in the year there will be no velocity of current exceeding 2.5 knots per hour, and on the other 69 days there will be twelve hours at least not exceeding this; so that in not more than approximately one-tenth of the time in a year will there be any velocity of current in excess of 2.5 knots per hour.

This canal will allow the largest class of ships proceeding to Dollarton, Barnet, Ioco, Port Moody and points on the Upper basin with greater ease and safety than the complete removal of the Second narrows bridge would give without the loss of time necessary to pass through locks; while all log booms and vessels that can pass under the 300 foot fixed span of the bridge are prac-

tically as free from menace as they would be if the bridge was removed, and may pass through the canal, if preferred; therefore the canal without locks is an improvement over all other proposals for all classes of navigation.

In respect to highway traffic the capacity of the Second narrows bridge will be greatly increased by the delays due to operating the bascule being avoided, and the opening over the canal being not subject to the delays due to congestion of shipping.

As ships will be able to pass through at all stages of tide and will not be limited to two hours per day as at present it has all the advantages that a causeway would give in this respect.

The provision of a safe passage for ships through the proposed canal entirely removes any menace to navigation from the Second narrows bridge and permits of it being legalized by the proper authorities, thereby saving the scrapping of nearly \$2,000,000 worth of property and permitting resumption of the same in the production of revenue after the necessary repairs have been made.

The only other proposal that would render this possible is that in Class 2, for none of the proposals for converting the 300 foot fixed span into a vertical lift, doubling the bascule, or reducing the current, can be considered to remove the menace—merely reducing it.

While the proposal in Class 2 would remove the menace at the bridge there would be a menace to ships approaching the entrance to the channel from the east, as the currents are still strong at that point, and there would be a cross-current due to the locks being an obstruction to its free flow.

The construction of a causeway across the narrows of the north arm of Burrard inlet, as proposed in the Class 5 proposals would very greatly reduce the velocity of the currents in the Second narrows and also in the First narrows, and is a suggestion that should be thoroughly considered in connection with the entrance of a railway into North Vancouver from the East via Ioco, but cannot be considered as removing the menace to navigation at the Second narrows as accidents did occur at or near slack water when there was very little current through the narrows.

The objection to damming the Second narrows and forcing navigation to pass through locks also applies in a lesser degree to damming the north arm of Burrard inlet.

COST OF CANAL AND FINANCING

The estimated cost of the canal, 200 feet wide at bottom and 30 feet deep, without locks, with necessary bridges over it, and creek diversion, is \$3,110,000.

That is much less than that of any proposal for high level bridges, tunnels, or causeways, and possesses the very great economy that the material excavated can be utilized for reclaiming tidal lands adjoining. By an additional expenditure estimated at \$1,400,000 for acquirement of adjoining lands, property damage, additional dredging and filling, and interest on bonds during construction, and \$740,000 for railway trestles, roadways, water mains, drainage, etc., making a total expenditure of \$5,250,000, can be formed a harbour and industrial development site of some 800 acres with three miles of waterfront on the inlet, and four miles fronting on the canal. This, we estimate, will when fully developed yield a yearly revenue from leases of over \$800,000, on a conservative valuation, and be capable of paying interest and sinking fund on the whole expenditure within three years of commencement of development.

The recommended proposal can therefore be carried out by an issue of bonds by the Vancouver Harbour Commission and avoid the necessity of grants of money from the Dominion Government, or from the cities and municipalities interested.

The time necessary to restore traffic across the Second narrows by this proposal need not be more than two or three months longer than that which would be necessary to replace the wrecked span of the bridge, as a channel can be dredged out to a width of 100 feet at bottom and 30 feet in depth in six or seven months from commencement of work and permit of navigation being diverted to the canal and erection of the span commenced—the canal being widened to the full dimensions as the material may be required for reclamation of land.

The cost of this preliminary canal would be approximately \$2,800,000 as against \$3,100,000 for a final canal 200 feet wide at bottom and 30 feet deep to low water.

The canal without locks is also free from the objection raised to a causeway that the elimination of rise and fall of tide might cause increased trouble from ice at Barnet and Port Moody, and also from any possible damage to property by raising the water level.

The benefits that will accrue to the community from the proposed harbour development will be greatest in the district of North Vancouver and city of North Vancouver which have suffered most from the interruption to traffic over the bridge and which contributed the largest amounts to the construction of the bridge.

While the bridge over the Second narrows is out of commission, the traffic between the north and south shores can only be taken care of by ferry service.

The traffic has been greatly reduced since the bridge was closed, but even this cannot be handled adequately by the present ferry service.

The traffic will greatly increase during the summer months and additional facilities must be provided in the ferry service.

This additional ferry service will have to take care of all traffic between the north and south shores during the construction of any improvements for navigation and traffic at the Second narrows or until such time as the Second narrows bridge can be re-opened for traffic.

The proposal submitted for improving navigation and traffic at the Second narrows requires that some public body or company should manage and make necessary provision to finance it.

We consider that the Vancouver Harbour Commission is the most logical body to carry out a proposal of this kind since they are in a position to take care of harbour development and the leasing of industrial sites, and can most readily finance the construction of the work while they are also in possession of the foreshore to be reclaimed and have the right of expropriation for any additional land required.

Respectfully submitted,

LOUIS E. CÔTÉ,

Chairman.

E. E. BRYDONE JACK,

Commissioner.

C. E. CARTWRIGHT,

Commissioner.

VANCOUVER, B.C.,

February 24, 1931.

APPENDIX VIII

ESTIMATES OF COST

CANAL AND CREEK DIVERSION—

Right of way for canal, 88 acres at \$1,500	\$132,000	
Right of way for railway and highway	75,000	
		\$ 207,000
Clearing right of way		7,500
Dredging canal 7,361,600 cubic yards		
Dredging creek diversion 1,440,000 cubic yards		
	8,801,600 cubic yards at 20 cents	1,760,320
Bulkheads to retaining along canal		200,000
Clearing old channel Seymour creek (additional to bulkhead)		4,000
Rebuilding railway in revised location		40,000
Rebuilding highway in revised location		71,180
Entrance jetties to canal		30,000
Hip rap on canal—100,000 cubic yards at \$1		100,000
Subway, Greater Vancouver water mains		50,000
Damages to property		25,000
Lights and signals		20,000
Land surveying		5,000
Legal expenses		5,000
Engineering, superintendents and contingencies		75,000
		<u>\$2,600,000</u>

BRIDGES—

Bridge over canal	\$300,000	
Guards for above	15,000	
Wharffaces, east and west of swing	50,000	
Bridge over creek diversion	120,000	
Moving Lynn creek bridge	25,000	
		\$ 510,000

HARBOUR AND INDUSTRIAL SITE DEVELOPMENT—TO UTILIZE DREDGED MATERIAL—

Acquirement of land	\$655,000	
Damages to property	50,000	
Legal expenses	10,000	
Interest on bonds	310,000	
Engineering and superintendent	25,000	
Additional dredgings and fillings	350,000	
		<u>\$1,400,000</u>

RAILWAY TRACKS, ROADWAYS, WATER MAINS, DRAINAGE,
ETC., ETC.

740,000
\$5,250,000