



THE CHRISTCHURCH LYTTELTON ROAD TUNNEL



Showing route to the portal of the Christchurch side of the road tunnel. The railway leading to the present tunnel leads through the middle of the photograph.

THE
CHRISTCHURCH
LYTTELTON
ROAD TUNNEL



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About 60,000 bales of wool are transported over the steep Evans Pass grade every year.

INTRODUCTION

THE CHRISTCHURCH-LYTTTELTON road tunnel may well be regarded as one of New Zealand's most historic projects. For nearly fifty years the lack of it has been a thorn in the side of the Dominion's commerce.

It is nearly 100 years since a well meaning if impractical section of the Dominion's then pioneer population rejected the idea of a vehicle tunnel to give road access to New Zealand's third largest port of Lyttelton because 'horses coming hot from the plains of Canterbury would catch cold on entering the tunnel'.

That was when a pioneer community had to choose between horse and cart access to the port of Lyttelton or a modern railway tunnel. They chose the railway tunnel which was 'just the latest thing' in cargo handling when completed nearly 90 years ago.

The inadequacy of this now out-of-date single track railway tunnel has cost New Zealand millions of pounds in delayed deliveries, double handling and slower turn round of shipping over the last half century.

That is why the recent consent by the Prime Minister of New Zealand to introduce a Christchurch-Lyttelton Road Tunnel Bill to make possible direct road access to the port of Lyttelton is of real consequence to the commercial system of the Dominion.

The economic and technical aspects of the project have been thoroughly investigated. An economic survey has been made by a public accountant of Christchurch.

The Ministry of Works has prepared a report on the technical aspects of the tunnel. The report includes estimates of costs and information on ventilation, lining and siting.

In addition the Civil Engineering Department of Canterbury University College has acted in a consultative capacity.



Petrol and oil is transport by road tankers over the present round and route from Lyttelton.

This mountainous road, sometimes dangerously iced in winter, is the city's main road link with the port of Lyttelton.



A TUNNEL TO PROGRESS

NEW ZEALAND COMMERCE will take one of its biggest forward strides of the century when a modern, two-lane vehicle tunnel is built to make quick road access from the Dominion's third largest port of Lyttelton through the Port Hills to Christchurch.

A Bill to establish a Road Tunnel Authority will be given its second reading in the present session of Parliament.

The Authority, a representative body of businessmen and local authorities, will then be responsible for building the tunnel.

This giant new £21/2 million engineering project—the longest road tunnel in the Dominion—will benefit the whole of New Zealand because it will remove the worst present blockage in our transport system.

USERS WILL PAY

Both the North and South Islands will benefit by the road tunnel, although users will pay for it.

This is because the Road Tunnel Authority will finance the tunnel by toll charges on freight tonnage and vehicles passing through it. The tunnel will be freehold in about 54 years.

A summary of an economic report on page 20 suggests that there will be no want of sufficient traffic to finance the tunnel through toll charges.

The estimated cost through the tunnel for goods—about 33/- a ton, including toll charges—shipside to warehouse—compares favourable with the present railway system charges.

But the time saved will be all gain for the merchant and the consuming public must reap the benefit.

TOLLS PROVED SUCCESSFUL

A toll system in New Zealand may be a trifle strange to some, but it has been applied most successfully to free enterprise roading projects in the United States of America.

There. Many of the public roading systems have become totally inadequate and hundreds of miles of magnificent new highways have been built without side entry and finally made freehold by an acceptable system of tolls.

There is also an historical precedent for the use of tolls in New Zealand. Many of the Dominion's early bridges and ferry services were financed by toll charges in the pioneering days.

An added assurance that users of the tunnel and not ratepayers will pay for it is provided by the fact that the Road Tunnel Bill gives the Road Tunnel Authority no rating powers whatsoever.

WHY BUILD IT?

In the view of responsible representatives of business and local government organisations, the road tunnel project is 'of paramount importance and a vital necessity to New Zealand commercial progress.'

The road tunnel will put an end to the large-scale bottlenecking of cargo transport through the present out-of-date, 90-year-old, single track railway tunnel which for nearly half a century has seriously handicapped New Zealand's transport system.

The new road tunnel will, in fact, place the Wellington Railway station within six and a half miles' driving distance of Christchurch's Cathedral Square.

The tunnel will halve the present, roundabout, dangerous, steep grade road journeys over the Port Hills, now the only road links between Christchurch and Lyttelton.

WHERE WILL IT BE?

Traffic will enter the new road tunnel on the Christchurch side of the Port Hills at a point not far from the portals of the existing railway tunnel. The road tunnel entrance will be only a few yards from the historic Bridle Path used by the pioneers when they walked over the hills for their first view of the Canterbury Plains more than on hundred years ago.

The road will come out on the Lyttelton side near the band rotunda in Norwich Quay at a place giving the ideal access to shipping, including the inter-island steamer. It will be connected by easily graded streets to the important new £3½ million Lyttelton Harbour enlargement project at Sticking Point.

The position of the portal of the tunnel at Heathcote gives very convenient connections with the city's main roading system. These are by way of the Port Hills and Opawa Roads to the southern parts of the city and to the west and south: by Ferry Road to the centre of the city and to all areas north of it as well as to the west and south: by Linwood Avenue to the city and north and east.

LENGTH? BREADTH?

The plan selected from those prepared by the Ministry of Works shows the new tunnel to be of a width of 37ft. with a length of about one and one fifth miles (6470ft.), and a head clearance over the whole roadway of fifteen feet.

There will be two vehicle lanes each of twelve feet— the National Roads Board's standard specification for roads and bridges.

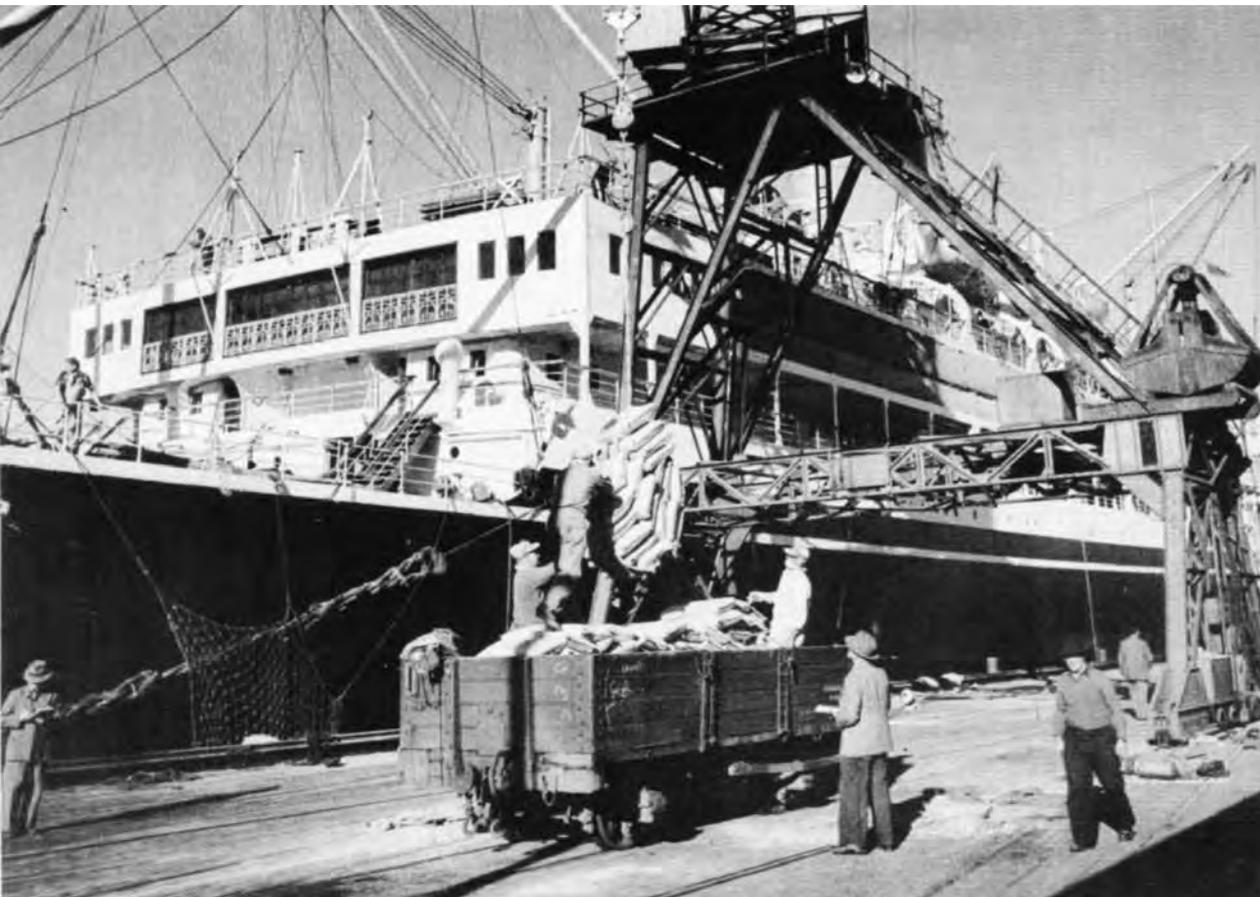
There will also be a five feet wide cycle track on either side of the tunnel and on the side a three feet wide pedestrian walk.

The tunnel will have an assessed capacity of about 2000 vehicles an hour. It will take about three years to build.

ALTEERATIVE ROUTE

Whatever present case there is for an alternative route is really the case for a by-pass to handle future requirements of an expanding area westward.

Any alternative route while a useful project in the future can only have value after the establishment of a direct road tunnel to the port. A front gate is wanted first. A side gate can be useful later.



A 100 YEAR OLD PROBLEM

THE IMPORTANCE to New Zealand commerce of satisfactory access between the port of Lyttelton and Christchurch was first evident soon after the Canterbury Pilgrims landed at Lyttelton in 1850.

In those days the early settlers had to cart their produce from the plains to Heathcote, near Sumner. From there it was taken by longboat and lighter round Lyttelton Heads to ships waiting in Lyttelton harbour.

In the meantime the Canterbury settlement's first surveyor had constructed a connecting road to Lyttelton from Sumner. It is part of this steep road, built more than 100 years ago, that is so inadequate as a road link for modern road cargo transport.

It was because even 100 years ago this road was unsatisfactory as an access between port and plains that, about 1867, the Lyttelton Railway tunnel was constructed.

It was built for £200,000 when Canterbury's total population was only 10,000.

By the turn of the century New Zealand commercial development had outgrown this single track railway but the line has continued to cause increasing blockage at a vital point in the country's transport system.

Two more road links, steeper and longer than the first, have been built, one which reaches Lyttelton by way of the head Lyttelton harbour at Governor's Bay and an even longer one through Gebbie's Pass.

In spite of its twenty-eight winding miles this last route has sometimes to be used because frosts in winter make the other two roads unsafe for valuable heavy transport.

DANGEROUS GRADES

Under normal weather conditions the present routes over the Port Hills are recognised as dangerous as well as slow and costly and have been the scenes of a number of tragic, expensive accidents.

The steep grade of Evans Pass has already been declared unsafe on more than one occasion.

Only this winter a large convoy of heavy vehicles of a construction company engaged in a big road reconstruction contract had to use the Gebbie's Pass route because of icing up of alternative routes over the hills.



Dangerous ice on Evans Pass in winter makes it necessary for heavy transport to use the even longer route over Gebbie's Pass.

The main present road access to the port was designed only as a subsidiary connection road between Sumner and Lyttelton.

This road is now called upon to carry more than 60,000 bales of wool yearly, besides thousands of tons of fruit, general cargo, petrol and oil,

The density of traffic on the outmoded Evans Pass route has been equal to that on the main South Road at Dunsdandel. Proof of this is given in the last census of the Transport Department.

A NATIONAL ASSET

NOT ONLY WILL the new road tunnel enable coastal and overseas shipping to be cleared quicker, but it will also speed up the whole of New Zealand transport.

A particularly important aspect of the new road tunnel's effect on inter-island trade is that it will relieve the inconvenience to shippers in North Island ports of having overseas ships unloading cargo destined for Lyttelton.

The road tunnel will thus cut out the practice (so often exasperating to shippers) of having overseas cargo unloaded at North Island ports and often being carried backwards and forwards in the holds of the interisland steamers because of inadequate facilities for quick handling at Lyttelton.

Wellington merchants do not want to wait for their cargo out of the Harbour Board sheds while men handle and rehandle transhipment cargo for Lyttelton. The Wellington Harbour Board does not want to provide shed accommodation in Wellington for Lyttelton cargo. Growing demands on capital and labour make it unsound. The shipping companies do not want to tranship to Lyttelton when they could discharge direct if there were road access to Christchurch and sheds to discharge into.

TO BENEFIT THE NORTH

Businessmen in Auckland and Wellington and most of the main centres in the North Island have for years put up with needless delays getting their good to and from the South Island because of bottlenecks at Lyttelton.

The business community of Auckland and Wellington and the whole of the North Island are entitled to better access to their South Island markets and better access for the raw material and manufactured goods which they draw from the south.

Because of this situation a group of resolute progressive representatives of business and local government in Canterbury has organised to endure that New Zealand should not any longer continue to endure the handicap of having the South Island's largest port continue with possibly the most antiquated and unsatisfactory port access facilities of any harbour in the Commonwealth.

It is significant for the tunnel project that the main increase in tonnage at Lyttelton in recent years has been in cargo from the other New Zealand ports.

The average size of overseas ships handled at the port has increased to between 11,000 and 21,000 tons.

Lyttelton's natural merits as a port have for years been largely nullified by crippling insufficiency of road access.

Mixed general cargo is of the kind most expedited in handling by road and Lyttelton has a high percentage of such mixed general cargo moving inwards and outwards.

COSTLY RE-HANDLING

There are at present four handlings necessary in the case of cargo which has to be sorted: ship to rail : rail to shed : shed to carrier and carrier to warehouse.

Under the road tunnel system with sheds at Lyttelton, handling of sorted goods will be : ship to shed : shed to carrier : carrier to warehouse, thus cutting down handling by at least 25 per cent.

On one occasion five cases for one consignee were received in Christchurch in five different wagons and several days apart.

TO LOWER TRANSPORT COSTS

Because of New Zealand's length, coupled with comparative sparseness of population, the cost of transport is a major factor in the cost of goods, and proportionately, is probably larger in New Zealand than in any other country.

To keep prices down it is therefore recognised as necessary to clear the arterial system of obstruction and keep our transport system up to date by shortening main routes, improving grades, and reducing unnecessary re-handling.

Recognising this and with the knowledge that the trend of all modern transport should be complementary rather than competitive the present policy of the National Roads Board is aimed at clearing the Dominion's arterial system.

This the road tunnel will do much to assist.

The inter-island ferry carries about 1000 cars a month and 180,000 passengers a year.

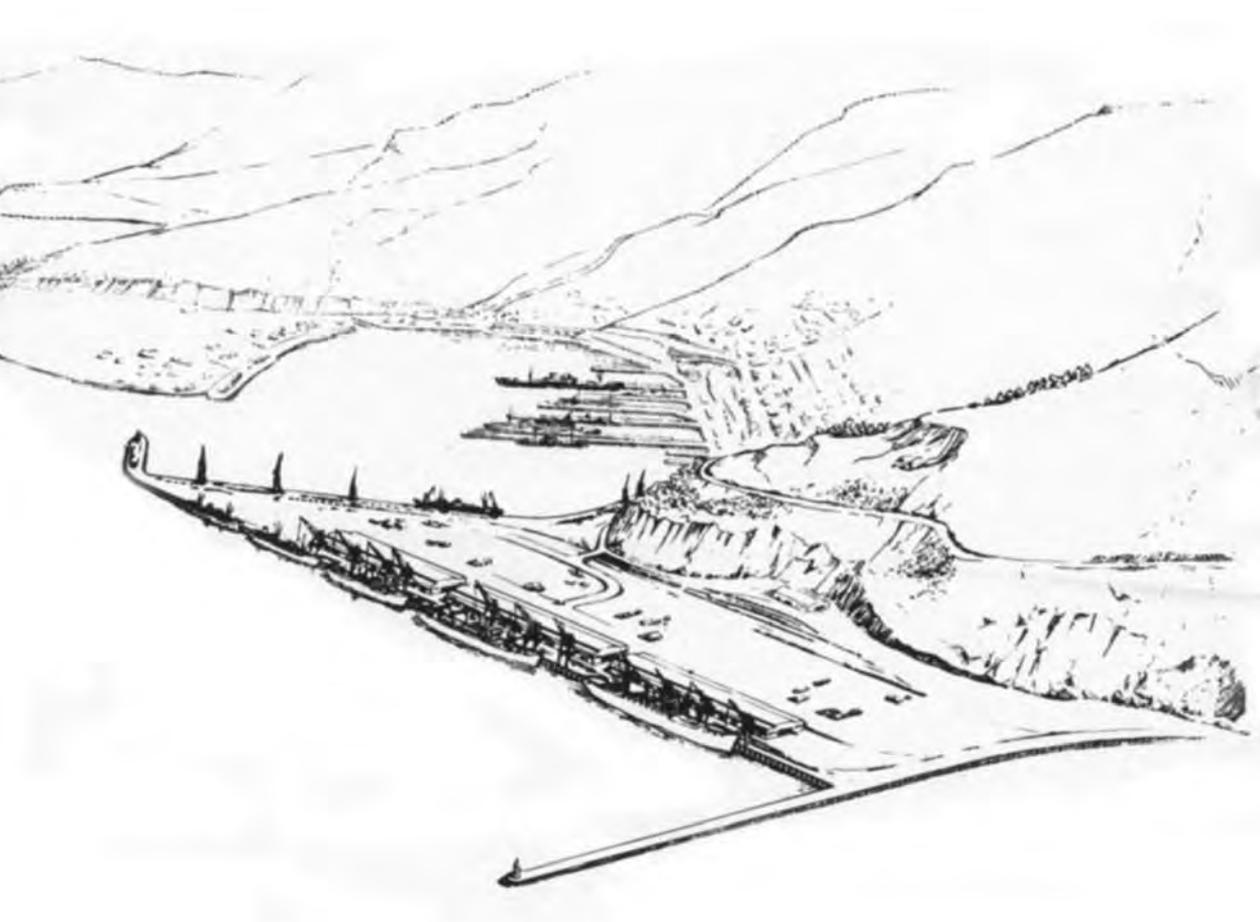
The road tunnel will feed these cars and passengers directly into the South Island transport system and enable buses, taxis and cars to reach the Lyttelton waterfront quicker than they can at present reach Sumner.



Aerial view of Lyttelton Harbour and the Port Hills with the city in the plains beyond.



The white circle shows the position of the Lyttelton portal of the road tunnel.



Part of the £3,500,00 Harbour enlargement project, which involves the reclamation of 41 acres of land, and the construction of some 2000 feet of additional deep-water berthage.

DEVELOPING THE PORT

CLOSELY RELATED to the road tunnel project is the new three and a half million pound harbour enlargement programme at Lyttelton.

This will make the port of Lyttelton, already the third largest in New Zealand, one of the Dominion's most important transport centres.

It would, however, be inefficient without the tunnel road to give quick access to the prospective 41 acres of reclamation at Stickings Point and the two thousand feet of new linear berthage beside it.

Although Lyttelton is New Zealand's third largest port with a yearly tonnage turnover of one and a quarter million tons, it is the only main port in New Zealand and one of the few in the world without road access to its wharves and sheds for handling and sorting cargo on its waterfront. In Auckland and Wellington the proportion of inward cargo carried by road is in excess of 85% of the total inward tonnage.

RAILWAY OUTDATED

The system of railway ports is recognized as being outdated. The Minister of Railways recognizes the need to relieve the Railways Department of the sole responsibility of handling cargo at Lyttelton. Some savings will be made in provision of railway trucks and additional sheds as the tonnage grows. During the last fifty years, but more frequently and acutely during the last year or two, serious congestion has occurred in spite of the strenuous efforts of the Department and the co-operation of all concerned through the Chamber of Commerce and carriers.

In the past 20 years Lyttelton has increased coastal cargo tonnage by 125 per cent, overseas tonnage by 90 per cent, and overall tonnage by 104 per cent. These figures exclude wheat, coal, fuel and phosphate to give the best indication of the increased in cargo normally handled in transit sheds and which would consequently be handled by road transport from the wharves.

RAILWAYS SUPPORT

The Lyttelton harbour Board's £3½ million port improvement scheme is already under way. The need for it and for road access to the wharves was significantly supported by the Railways Department in evidence before the Royal Commission on the Waterfront Industry in 1951 when the department stated that its facilities were fully taxed.



When speed is imperative in the unloading of perishable cargoes such as island fruit, the Railway Department permits trucks to load direct from the ship.

The tunnel road is not a competitor of the Railways Department but will complement its services. The department has already admitted that its equipment is no longer adequate to work the port of Lyttelton and has expressed the wish to hand over the working of the port to the Harbour Board.

With the growth of the province additional shed accommodation must be provided. It would be a mistake to extend shed accommodation in Christchurch when the cargo sheds will be built at the port under the Harbour Board's scheme.

Every ton of cargo handled by rail means a loss of net revenue to the railways and an additional cost to the community.

Approximately eighty five per cent of goods ex ship at Lyttelton have to be sorted at Christchurch

Present figures of the port of Lyttelton indicate that approximately three quarters of a million tons of cargo will go through the new tunnel each year over the next 20 years.

The road tunnel and port improvement plans must march together. At the same time the road tunnel should be pierced during the earlier works of the harbour scheme for these reasons :

1. To provide spoil for breakwaters, etcetera.
2. To serve existing Evans Pass road traffic, now dangerous, for wool, oil, fruit and other straight lines of cargo in and out.
3. To fit in with any plans the Harbour Board carry out for sheds on wharves to handle cargoes from smaller coasters and smaller shipments from overseas vessels at certain seasons now transhipped
4. To facilitate the changeover of steamer passenger traffic from rail to road and enable the reorganization at Lyttelton to be proceeded with.
5. To enable steamer express cargo to be handled expeditiously in all weathers through a small shed on the steamer express wharf.

Costly congestion at Lyttelton is duplicated in the Railway goods sheds at Christchurch where double handling is a frequent cause of delays.



BUILDING THE TUNNEL

THE NEW TUNNEL SITE, not far from the existing tunnel, is expected to have the same easy going through the rock which enabled the pioneer workers to put the railway tunnel through in three years.

Today's tunnellers have the added advantage of modern methods which would make such a scheme only a minor one even by comparison with the recently completed rail tunnel through the Rimutakas between Wellington and the Wairarapa.

One of New Zealand's leading constructional engineers considers that the tunnel road could be put through in a year working at high pressure.

A tunnel of the size recommended in a report by the Ministry of Works would have :

- (a) A 24-foot roadway of two 12ft. lanes. This is the National Roads Board's standard for roads and bridges.
- (b) Cycle tracks (2) each 5ft. wide on each side of tunnel.
- (c) Pedestrian walk 3ft. wide on one side of tunnel.
- (d) Overall width inclusive of cycle tracks and footpath will be 37ft.
- (e) Head clearance over roadway 15ft. Double-deck buses are 13ft. 5in. high.
- (f) Lining, 18in. of plain concrete.

Capacity of the Tunnel: It is considered reasonable to assess the maximum capacity of the tunnel at 2000 vehicles per hour.

Ventilation: The transverse system of ventilation is recommended, fresh air being introduced along the length of the tunnel at kerb level and withdrawn along the length of the tunnel through ducts near roof level.

Time to complete : Three years if working from each end and 24 hours a day, five days per week.

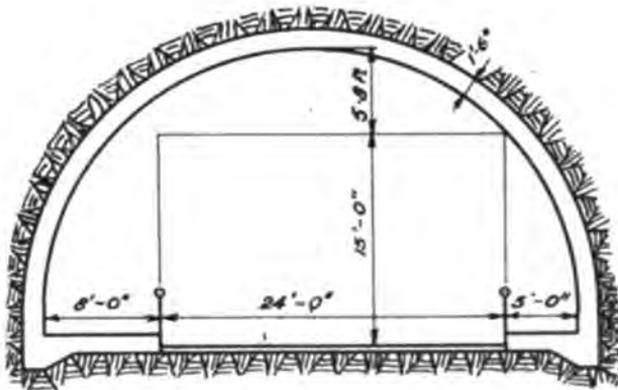


Diagram of a section of the road tunnel showing cycle and footway on the left, the roadway centre, and cycleway on right.

COST OF CONSTRUCTION is estimated as follows:	£
Excavate and line tunnel	1,929,000
Ventilation	150,000
Lighting	18,000
Pavement in tunnel	43,000
Roading outside tunnel	355,000
(24ft. roadway and two cycle tracks)	
Approach works Lyttelton	20,000
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	£2,515,000
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STAGES OF FINANCIAL REQUIREMENTS :

1st year 25%
 2nd year 35%
 3rd year 40%

REVENUE

It is as well to bear in mind that little or no precedent exists for the computation of costs and revenue. In many instances I has been necessary to arrive at results and final figures by estimate and by deduction. The period for estimating the economics of the project is twenty years.

PROPOSED CHARGES

Goods five shillings per ton.
 Trade Vehicles two shillings each per journey.
 Private vehicles sixpence each per journey, including driver.
 Passengers threepence each per journey.

POTENTIAL TOLL REVENUE — Annually —

From goods, trade vehicles, private vehicles, passengers by private and public transport

	£249,327
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OUTGOINGS — Operational costs and toll collections	£121,029
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ESTIMATED ANNUAL SURPLUS —	£128,298
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ESTIMATE OF PERCENTAGES OF GOODS TRAFFIC BY ROAD	ANNUAL TONNAGE	
Inwards 60%		682,069
Outwards 30%		170,517
		<hr/>
		852,586
		<hr/>

COMPARATIVE COSTS ROAD AND RAIL

	RAIL	ROAD TUNNEL
Goods per ton	£1-12-3	£1-13-2 inc. toll
Passengers 1st class single	1/6	1/6*

(Transport Board bus fare to Sumner, 8 miles is 1/1d. Midland Motorways fare to Belfast, 7 miles is 1/3d. Adding the passenger toll to the higher of these equals 1/6d.*)

The following are the approximate tonnages passing over the wharves at Lyttelton taken at five yearly intervals between 1935 and 1955 :

1935	604,537
1940	670,503
1945	658,275
1950	929,181
1955	1,229,542

The following shows the population increases in the Christchurch urban area taken at the census intervals from 1936 :

1936	133,515
1945	151,068
1951	174,221
1956	193,182

The following is the appropriate increase in motor vehicle registration in Canterbury taken at five yearly intervals from 1935 to 1955 :

1935	22,000
1940	31,000
1945	42,000
1950	55,000
1956	83,000

The new road tunnel brings motorists by Steamer Express within 6 1/2 miles by road from Cathedral Square.



THE TIME FOR ACTION

AS EARLY AS 1916 prominent businessmen began publicly to emphasize that a road tunnel to give adequate road transport access to the port of Lyttelton was a vital commercial necessity to the whole of New Zealand.

In 1930, 80 leading citizens, mostly businessmen, gave 200,000 words of evidence before the Commission on Direct Access to the Sea. It was accepted that New Zealand's future demanded a road tunnel to the port of Lyttelton. Only a few questioned the immediate necessity.

FULL SUPPORT

Both employer and employee organisations are in full agreement about the need for the tunnel.

Guided by both engineering and economic surveys as well as their own experience business executives and local authorities in Canterbury are now sure New Zealand cannot any longer afford to delay the construction of the road tunnel.

The need for the road tunnel has been intensified in recent years because of the unprecedented increase in population, the rapid expansion in manufacturing and primary production in Canterbury and ever-increasing tonnage handled at the port of Lyttelton.

Canterbury has had the biggest percentage increase per head of population of persons entering the industrial employment. Canterbury heads the list with a comfortable margin with 8.9 per cent of population, an increase of 89.6 per cent since 1934.

NO DELAY

With the passing of the Road Tunnel Empowering Bill there can be no need for delay.

Equipment and machinery are available and with the Rimutaka tunnel and the Roxburgh power project recently completed there is probably more suitable labour available in New Zealand than ever before for the construction of the Christchurch-Lyttelton road tunnel.



The Christchurch Transport Board has already applied for permission to operate its modern fleet of buses through the road tunnel.

From the point of view of the development of Canterbury the road tunnel will improve access to the province's expanding seaside residential area at Diamond Harbour.



THE ROAD TUNNEL BILL

EXPLANATORY NOTE

THIS BILL constitutes an Authority for the purpose of constructing and maintaining a road tunnel through the Port Hills between Christchurch and Lyttelton, prescribes the powers and functions of the Authority, and makes provision for the financing of the project.

PART I provides for the constitution and membership of an Authority to be called the Christchurch-Lyttelton Road Tunnel Authority. The Authority will consist of seven members, of whom two will be appointed by the Governor-General, two by the Christchurch City Council, one by the Lyttelton Borough Council, one by a combination of prescribed Borough Councils and Town Councils in Canterbury.

PART II authorises the Authority to construct, maintain, manage, and control a road tunnel through the Port Hills. For those purposes the Authority is given the powers of a local authority under the Public Works Act 1928.

The Authority is given power to prepare plans, specifications, and conditions of contract in respect of the project and is directed to submit these to the Minister of Works, the Christchurch City Council, the Lyttelton Borough Council, and the Heathcote County Council. The local authorities mentioned will have the right to approve or disapprove of the plans to the extent that their own localities are affected. The same provisions will apply in respect of any variation in the plans during the construction of the tunnel. No work will commence until the plans, specifications, and conditions of contract are finally approved by the local authorities concerned and by the Minister.

PART III provides for the financing of the proposed tunnel, The Authority is given power to borrow money by the way of special loan under the Local Bodies' Loans Act 1926 and also to borrow on overdraft. All loans raised by the Authority will be guaranteed by the Government. In the event of any default by the Authority requiring the Government to make any payment under its guarantee, the Governor-General may appoint a Commissioner to exercise the powers and functions for the Authority.

Provision is made for the preparation by the Authority of an annual estimate of expenditure and revenue and for the submission of a copy of the estimate to the Minister of Finance.

PART IV authorises the Authority to charge tolls in respect of the use of the tunnel. The rates of tolls will be prescribed in bylaws but will require to be approved by the Minister of Finance.

Provision is made for the exemption of certain specified persons, such as constables and postmen on duty, from the payment of tolls.

PART V requires proper books of account to be kept by the Authority and also requires the accounts of the Authority to be audited by the Audit Office, which for that purpose is given the same powers as it has under the Public Revenues Act 1953 in respect of public money and the audit of local authorities' accounts. The Authority is required to prepare an annual balance sheet and statement and forward a copy to the Audit Office and to the Minister of Finance.

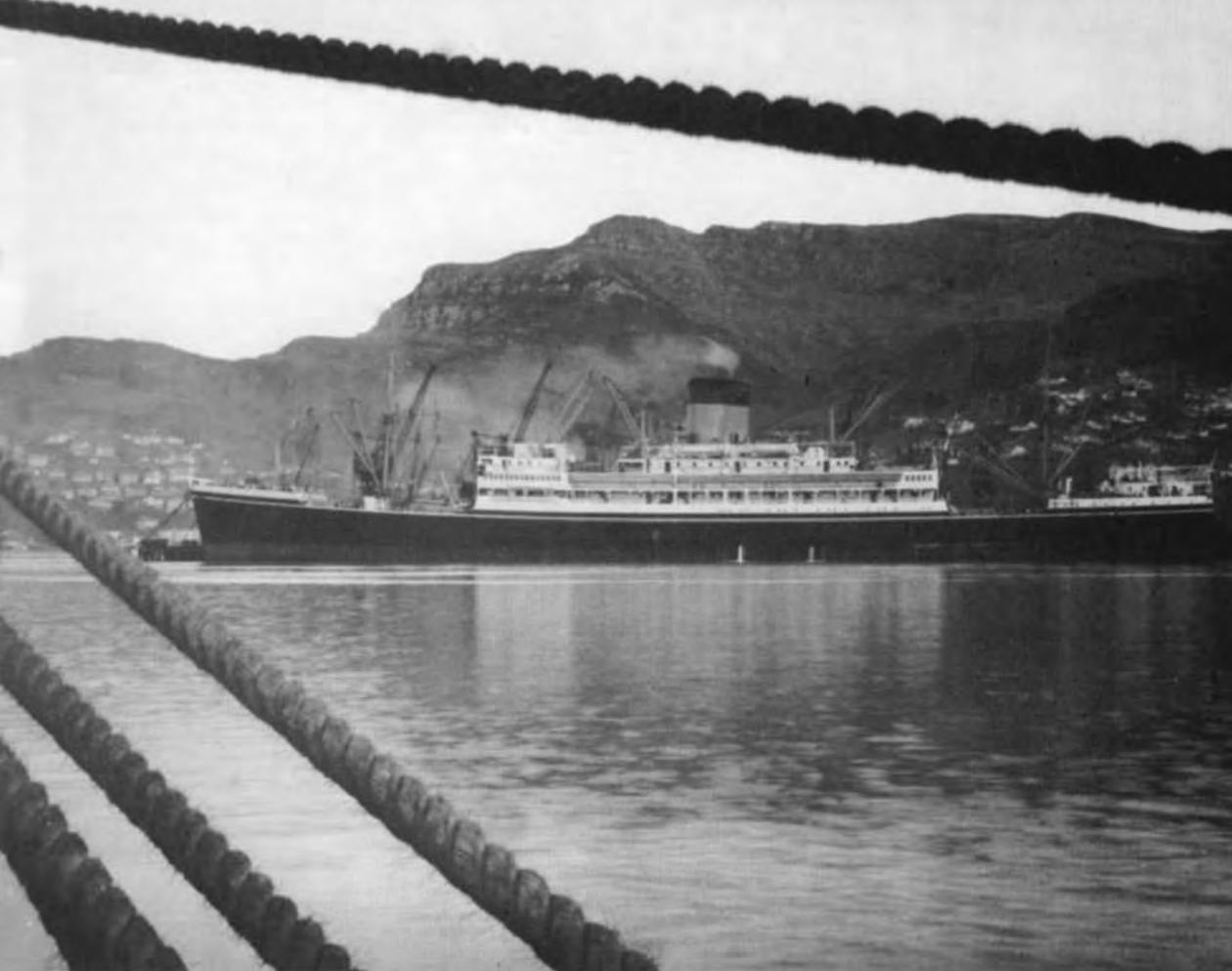
PART VI makes provision in respect of bylaws of the Authority. Power is given to make all necessary bylaws in respect of the use and control of the tunnel, and the procedure to be followed in making bylaws will be similar to that prescribed by the Municipal Corporations Act 1954 in relation to bylaws made by municipal corporations. Fines payable in respect of the breach of any bylaw will be paid to the Authority.

PART VII contains miscellaneous provisions and provides for the payment of preliminary expenses of the Crown, and the Christchurch-Lyttelton Road Tunnel Committee, the superannuation of employees of the Authority, the making of contracts by the Authority, the payment of unauthorised expenditure by the Authority, the inspection of the tunnel by the Minister of Works, the reference of disputes to arbitration, the penalties for offences against the proposed Act, and the making of regulations.

Clause 62 authorises the Minister of Works to require the Authority to do such work in connection with the tunnel as he considers necessary and, in the event of non-compliance with any requisition, to have the work done himself at the expense of the Authority.

Clause 63 prohibits the interference with Government works by the Authority without previous written consent of the Minister of Works.

Because so many persons have taken an energetic and prominent part over the years in promoting the scheme it is proposed, as soon as the Road Tunnel Authority is set up, to issue a further publication dealing more fully with the history and background of the endeavour. This is planned to cover the period from the time when need for the tunnel road was first recognized nearly half a century ago.



New Zealand ports are now being called upon to accommodate bigger ships than ever before, the Gothic at Lyttelton.

This booklet has been prepared for the executive of the Christchurch-Lyttelton Road Tunnel Committee by Albion Wright Limited.

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