

494



1. CURRENT UNCERTAINTY

The future of Auckland's public transport is unresolved at the present time. A rapid rail system has been recommended to supplement bus services, and a Technical Advisory Committee is currently making an intensive study of the cost and effectiveness of the rapid rail proposal. Until conclusions have been reached and decisions made upon them, it is not known when or whether there will be a rapid rail facility.

Therefore, in planning the Central Area at this time, it has been necessary to consider both possibilities, i.e. the main public transport component as an all bus system, or as a combined bus and rapid rail system.

2. SURVEY SUMMARY

2.1 Public Transport within the city

The city has grown with public transport routes radiating from the Central Area. However, in recent years, areas of employment have developed in the outer parts of the city, and this has resulted in patterns of travel which are difficult to serve by public transport.

Also, a rising standard of living has resulted in increasing ownership and use of cars. As a result, despite a growing population, public transport trips have decreased from a war-time high of 100 million passengers per year to 73 million in 1964.

In 1963, 22% of all trips in the city were made by public transport. In the later part of this century it is expected that fewer than 10% of all trips will be made by public transport.

Analysis of trips on two bus routes in stable residential areas (Richmond Road and Herne Bay) has shown that peak hour trips have dropped by 25%, and off-peak by 50%, over the last 15 years. The only routes where public transport patronage is remaining relatively constant are in the outer developing suburbs, with their increasing populations.

2.2 Public Transport to the Central Area.

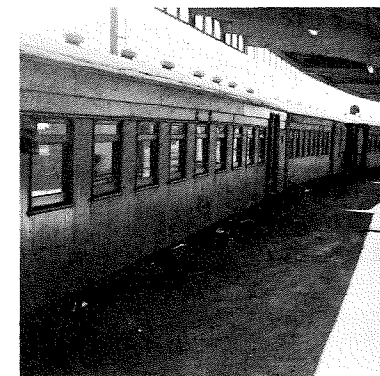
Of the 110,000 people arriving in the Central Area daily:

55,000 (50%) travel by private motor vehicle;
3,000 by ferry;
2,000 by rail;
50,000 by bus

In 1963, 17.5% of all trips in the city were to and from the Central Area. By 1986 it is projected that only 12.2% of the total trips in the city will be to the Central Area.

Work trips make up 87% of peak hour public transport trips, and 60% of the daily trips to the Central Area by public transport.

Off-peak bus patronage drops to 25% of the peak hour patronage. Shopping is the main purpose for off-peak bus trips.



PUBLIC TRANSPORT



At the present time about 540 buses arrive or depart from the Central Area in a peak hour.

2.3 Effect of rail rapid transit

In the DeLeuw, Cather transit proposals, rapid rail services are proposed to run on existing tracks north to Henderson and south to Manurewa or Papakura. Where appropriate, buses in the outer suburbs would feed to rail rapid transit stations, and passengers would transfer and make the remainder of their trip by rail.

DeLeuw, Cather estimated that approximately 27 million passengers per year would use the rail transit system. 33% of the buses with passengers destined for the Central Area would feed to rail rapid transit stations.

Buses would still come to the Central Area from the North Shore, Eastern Suburbs, Ponsonby, Herne Bay, and the southern isthmus suburbs. Sixty-six per cent of all buses would still terminate in the Central Area.

In addition to taking feeder buses, some people would walk and others would come by car to take the rapid rail service. However, it is expected that well over half of the people arriving in the Central Area by public transport would still arrive by bus.

2.4 Bus systems within the Central Area

The suburban buses are routed along various Central Area streets to their

terminal stops, and pick up and drop off passengers en route.

Of the 3,200 feet of terminal stops and peak hour lay-up spaces required for buses in the Central Area, 2,600 feet is kerb-side and 600 feet is provided at the Municipal Bus Terminal.

At the present time, three bus services are run to provide for trips exclusively within the Central Area. These are the Queen Street shuttle bus, and the two Farmers free bus services.

3. FUTURE PUBLIC TRANSPORT DEMANDS

Efficient and attractive public transport is essential to the Central Area. It would be impracticable to provide the additional roading necessary if all public transport passengers were to change to private cars.

Public transport is also necessary for "captive-users", i.e. the very old and the very young, and other people who do not own or have the use of a car.

Public transport cannot compete in terms of comfort, convenience and travel time, until congestion and/or lack of parking makes the use of private cars impossible. It is expected that the trend for decreasing use of public transport will continue until the parking and roading system reaches capacity.

Improvements in public transport, particularly major improvements such as the introduction of a rail rapid transit



system, may attract more people to public transport, but the biggest future increase in the use of public transport will be caused by the roading system reaching capacity. (This assumes that public transport does not also fail because of congestion.) It is expected that the roading system will reach its capacity about 75% above present flows at about the same time the motorways to the Central Area are completed (about 1990).

The effect of these trends is shown diagrammatically in Fig. 51.

It is considered necessary that public transport should be improved and made more attractive in order to compete more effectively with private transport. It should also be improved in anticipation of the increased demands which will be made on it when the limit to the number of cars able to come to the Central Area is reached.

Therefore there will be a continuing need to provide for buses in the Central Area. A rail rapid transit system, as proposed by DeLeuw, Cather in their transportation study, would still require a considerable number of buses to come to the Central Area, the rapid transit system replacing only about one-third of the present buses. Provision will have to be made for at least two-thirds of the present buses, and for all buses if the rail rapid transit system does not proceed in the near future.

4. PROPOSALS

4.1 Past proposals

Over the years, a number of groups investigating transport in Auckland have made suggestions on the accommodation of buses in the Central Area. These studies include the Master Transportation Plan of 1955, which favoured off-street terminals; the DeLeuw, Cather report, which recommended on-street terminals, with high usage of Albert and Queen Streets, the Buchanan report, which favoured use of Queen Street as a terminal; and the "Joint Committee on Bus Routeing" of 1968, who suggested three alternative on-street routeing patterns.

These recommendations have been studied and seven different bus routeing systems have been investigated. Results are summarised in Fig. 52.

4.2 Methods of evaluation

The systems have been evaluated on a number of aspects, so that the relative effectiveness of the different schemes can be assessed. Aspects considered in the evaluation are:

(a) Total Bus Running Distance Within the Central Area:

This gives a measure of time spent in the Central Area, and was obtained by multiplying the trip length within the Central Area for each route by the number of buses using that route.

(b) Average Passenger Walking Distance for Each System:

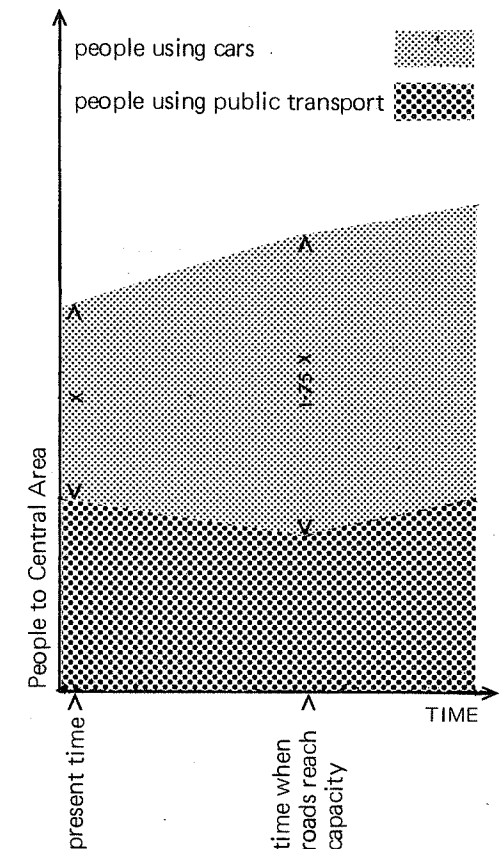


Fig. 51
Probable future travel to the Central Area

Fig. 52 Comparison of bus systems

System	Cost	Bus Central Area Running Distance	Av. Pedestrian Walking Distance	Legibility	Ease of Transfer	Effect on Streets	Other Effect
1. Queen Street looping	\$163,000	3,038 miles	569 yards	good	good	Queen Street taken over for buses. Albert Street available for other uses.	Detrimental to Queen Street environment, visually, noise and fumes.
2. Two terminals with moving footpath in Queen Street	\$7,500,000*	2,764 miles	552 yards	good	good	Frees streets for other uses.	
2A. As above but no Queen Street moving footpath	\$7,500,000		633 yards	good	good	Frees streets for other uses.	
3. Albert Street underground terminal	\$12,000,000	3,229 miles	512 yards	good	good	Frees streets for other uses.	Poor service to Symonds Street and University.
4. Remote on-street loops	\$80,000	2,728 miles	697 yards	poor	poor	Uses Kitchener Street, Albert Street, etc., for buses.	
5. Kitchener Street underground terminal	9,600,000	3,179 miles	485 yards	good	good	Frees streets for other uses.	Poor service to Hobson Street ridge.
6. Existing system	\$80,000	2,996 miles	572 yards	poor	poor	Uses many streets for buses.	

*Does not include Queen Street moving footway.

PUBLIC TRANSPORT

This gives a measure of how well the system delivers public transport passengers to where they want to go. For each route in each system the walking distance from the route to each origin/destination zone in the Central Area was measured. Using the DeLeuw, Cather data for public transport trips in 1963 to each zone, the number of people walking the distances measured was determined. The 1963 distribution of passengers is shown in Fig. 53. Average walking distances for each system were calculated, and the distribution of walking distances for each system graphed.

(c) Costs:

Preliminary estimates of the cost of implementing each system have been calculated.

(d) Convenience, Comfort, Legibility:

This is a qualitative assessment of how the system appears to the user, and includes facilities at terminals, ease of transfer between routes, and ease of understanding of the system by users.

(e) Effect of the System on Other Street Operations:

This covers the effect of the bus system on other traffic movement, and kerbside usage such as parking and goods service vehicle loading.

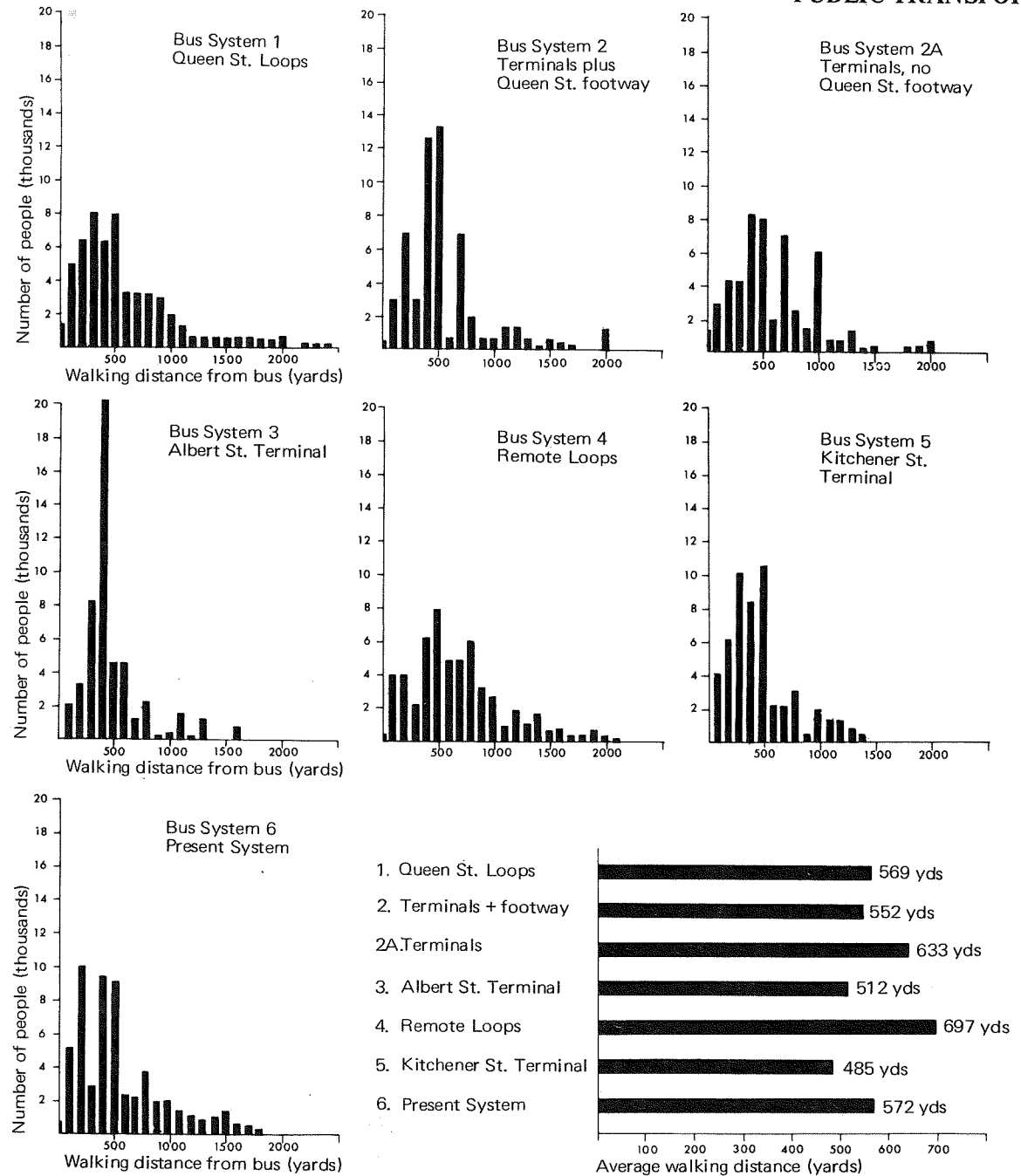


Fig. 53 Passenger walking distances in the Central Area for different bus systems

**4.3 Proposal No.1 –
Queen Street loops**
(Figs. 54 & 55)

This scheme is based on the proposal (No. 3) put forward by the Joint Committee on Bus Routeing (30th August, 1968). Queen Street is divided into space for seven loops, and each route has one terminal stop in Queen Street. The routes have been arranged so that running distances in the Central Area are kept as low as possible. All terminal stops, Karangahape Road, and the Railway Station are linked by a short-headway shuttle bus.

The footpaths in Queen Street are already loaded to capacity with pedestrians in peak hours, and if terminal bus stops are established in Queen Street it will be essential to widen the footpaths to

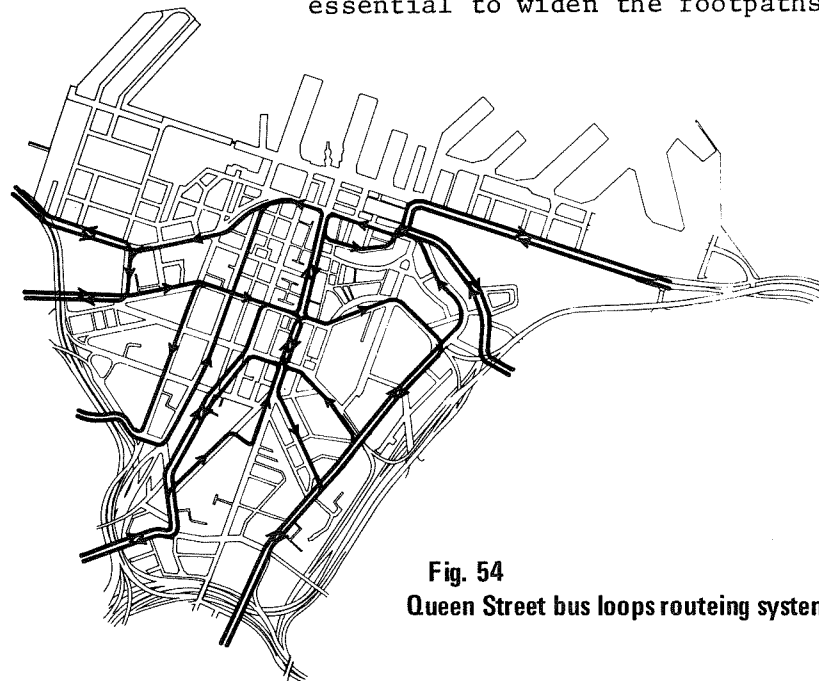


Fig. 54
Queen Street bus loops routeing system

accommodate the queueing and waiting bus passengers. At least 8 to 10 feet widening of the footpaths will be necessary. In addition, especially for off-peak passengers, adequate seating and shelter would have to be provided on the widened portion of the footpath. The shelters should incorporate timetables and other information on the bus services. A possible layout of the widened footpaths and shelters is shown in Fig. 55.

Evaluation:

This scheme would result in the prohibition of private car parking in Queen Street, and the banning of goods service vehicle loading at least during peak hours. In peak hours, Queen Street would, in effect, be given over to bus operations.

There would be some compensation in the removal of buses from Albert Street, permitting freer traffic flow.

The looping system conflicts in some areas with the currently accepted one-way street proposals, and some modification of the one-way streeting would be required.

With its terminal stops concentrated on Queen Street, this scheme would give good access to the main retail areas, relatively easy transfer between routes, and should be easily understood by the public. However, the concentration of buses into Queen Street could adversely affect the Queen Street environment. Lines of stationary and moving buses, relatively much larger than the present private cars using Queen Street, could block outlook from footpaths, and the buses could cause

problems due to noise and air pollution.

The cost of implementing the scheme is estimated as:

Widening footpaths	\$40,000
Shelter, seats, etc.	120,000
Trees	<u>3,000</u>
	<u>\$163,000</u>

The bus running distance is 3,038 miles.

The average walking distance for passengers is 369 yards, only 3 yards less than for the existing system. The distribution of walking distances is shown in Fig. 53.

Advantages:

* Simple, easily understood system.

* Frees Albert Street for other traffic.

* Good bus access to main retail area.

* Good transfer between routes.

* Low cost.

* Fairly low average pedestrian walking distance.

Disadvantages:

* Banning of private car parking in Queen Street, and restriction of goods vehicle operations.

* Conflict with one-way street proposals.

* Detrimental to Queen Street environment, visually and by noise and fumes.

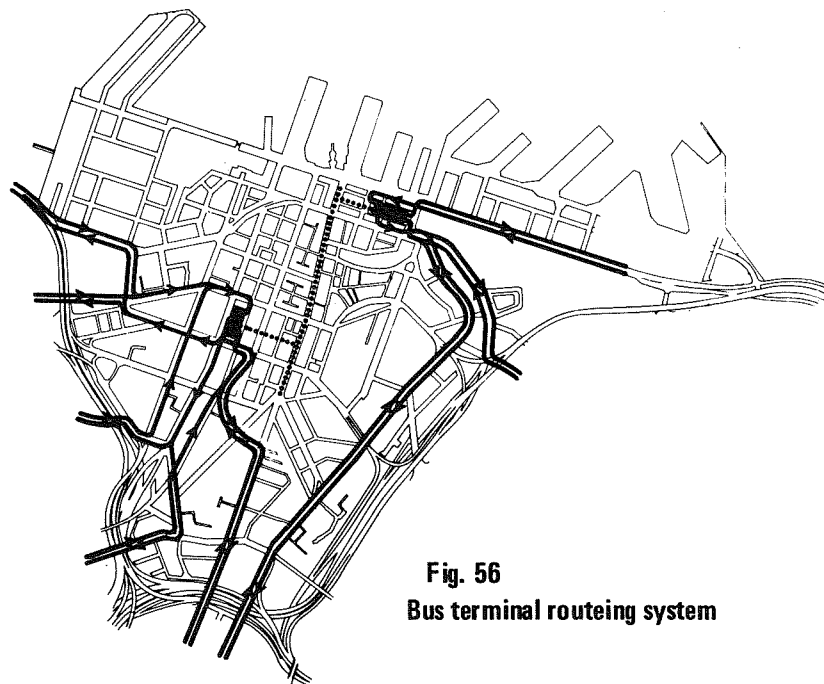


Fig. 55 Queen Street layout

* Relatively high bus running distances in Central Area.

**4.4 Proposal No.2 –
Bus terminals
(Fig. 56)**

In this scheme, two major off-street terminals are proposed: a terminal on the site of the existing Britomart Place terminal and a new terminal on the site bounded by Hobson, Victoria, Federal and Wellesley Streets. The new Federal Street terminal, which would handle about 65% of the buses, is envisaged as a multifunctional development, including parking, office and retail space, which would help to cover land costs. The existing Britomart Place terminal would



**Fig. 56
Bus terminal routeing system**

have to be doubled in capacity and the opportunity could be taken to develop this site comprehensively as well.

Both the terminals are fairly remote from Queen Street and the main areas of public transport passenger destinations. The proposed Federal Street terminal is planned to connect with a proposed rail rapid transit station in Hobson Street, but it suffers not only from its distance away from Queen Street, but also from its position high on the ridge above the Queen Street valley. The climb up the hill would be a strong deterrent to its use. To increase the attractiveness of this terminal, a high capacity pedestrian link with Queen Street is considered necessary, incorporating escalators and moving footways. This would give access to Queen Street in the vicinity of Derby Street.

In the evaluation of this system the effect of a moving footpath up and down Queen Street has been included. This would assist the distribution of passengers from the fairly remote terminals, and also help pedestrian movements generally. A scheme for such a footway is shown in Fig. 31. A shuttle bus service would also be required to link the terminals, Karangahape Road, Symonds Street, and the Railway Station.

Evaluation:

This scheme would minimize the interference of buses with other traffic, and would make a large amount of kerb space, at present used for terminal bus stops, available for parking and other uses. In

effect, an increase in capacity of the street system would result in some areas.

The terminals would provide good levels of comfort and convenience for patrons, ease of transfer between routes, and an easily understood system.

The location of the terminal on the Hobson Street ridge would encourage development in this area.

The cost of implementing the scheme is estimated as:

Federal Street terminal (including land cost and pedestrian link to Queen Street)	\$5,500,000
New Britomart terminal	<u>2,000,000</u>
	<u>\$7,500,000</u>

The estimated cost of an elevated moving footpath in Queen Street is

The bus running distance with this scheme is 2,764 miles.

The average walking distance for passengers, assuming that a moving footpath effectively halves the walking distance for those able to make use of it is:

(a) with Queen Street moving footpath	552 yards
(b) no Queen Street moving footpath	633 yards

Advantages:

- * Frees streets for other uses.

- * Provides a simple, easily understood system.

- * Good facilities for patrons.

- * Concentration of buses onto a few streets, which would allow traffic management favouring buses.

- * Comparatively low Central Area running distance.

Disadvantages:

- * Fairly high cost.

- * Passenger distribution is poor without a Queen Street moving footpath, and only average with a Queen Street moving footpath.

**4.5 Proposal No.3 –
Albert Street underground terminal**
(Figs. 57, 58 & 59)

This scheme proposes the construction of a linear bus terminal underneath Albert Street. A two-level structure would be built, the upper level, at the present ground level, carrying the existing street functions and the lower level catering for buses and their passengers. The terminal would extend from Customs Street to south of Wellesley Street, with entry for buses at both ends. Each bus route would have its terminal stop at the far end from its point of entry into the terminal, with at least one other stop in the terminal to set down and pick up passengers. Pedestrians would have access to Albert Street or laterally from the bus terminal

to the streets leading down to Queen Street. A shuttle bus system would be required to distribute people to Karangahape Road, Symonds Street and the Railway Station.

Evaluation:

This system, like the two terminal system, would free the streets for other activities; parking, loading, and general traffic movement. With all buses using the same terminal, the system would permit easy transfer between routes, and be easy to comprehend. A good standard of convenience and comfort for passengers would be achieved, with good access to the Queen Street valley. This system could tend to encourage growth on the Albert Street side of the Queen Street valley.

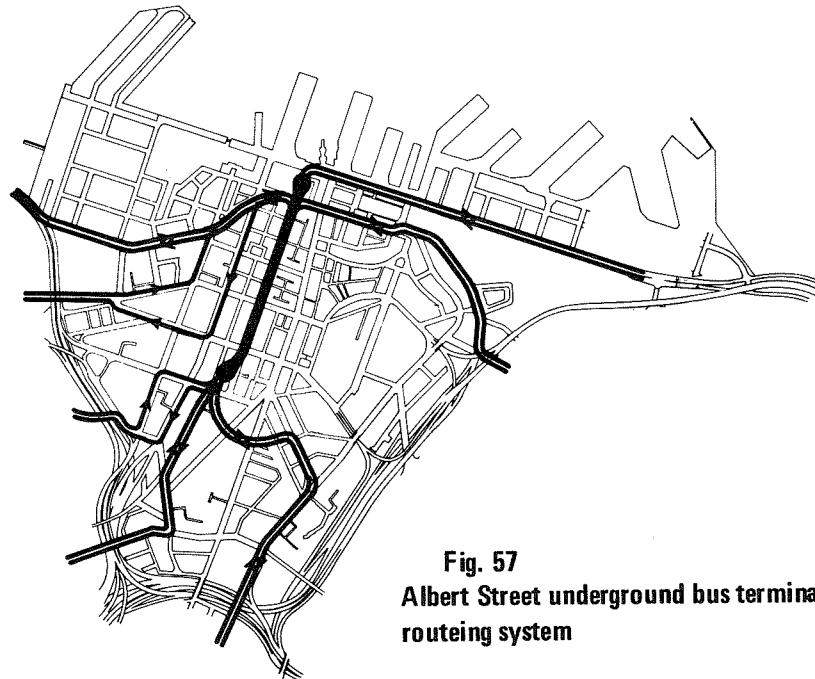


Fig. 57
Albert Street underground bus terminal routing system

The estimated cost of the terminal is \$12,000,000.

The bus running distance in the Central Area, which includes running within the terminal, is high at 3,229 miles.

The distribution of passengers is good, with an average walking distance of 512 yards.

Advantages:

- * Streets freed for other uses.
- * Simple system with good transfer between routes.
- * Good level of comfort and convenience for passengers.
- * Good distribution of passengers.

Disadvantages:

- * Very high cost of system.
- * Problems of cut-and-cover construction.
- * Poor service to Symonds Street and the University.
- * Fairly high Central Area running distances for buses.

4.6 Proposal No.4 – Remote loops (Fig. 60)

This system is based on a similar looping principle to the Queen Street looping, but

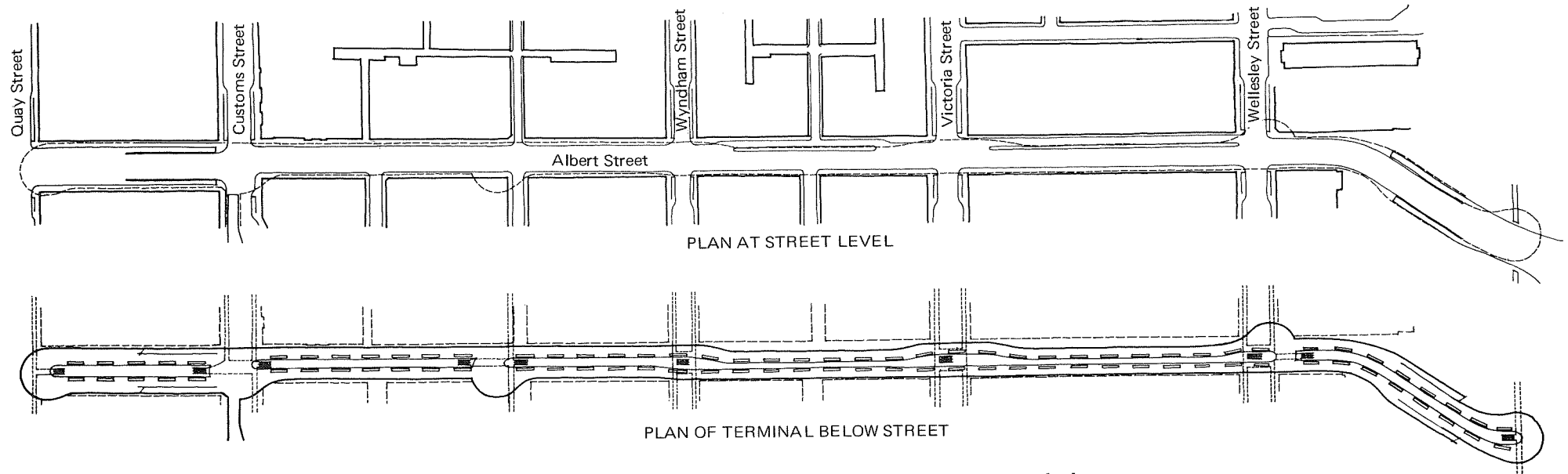


Fig. 58 Plan of proposed Albert Street underground bus terminal

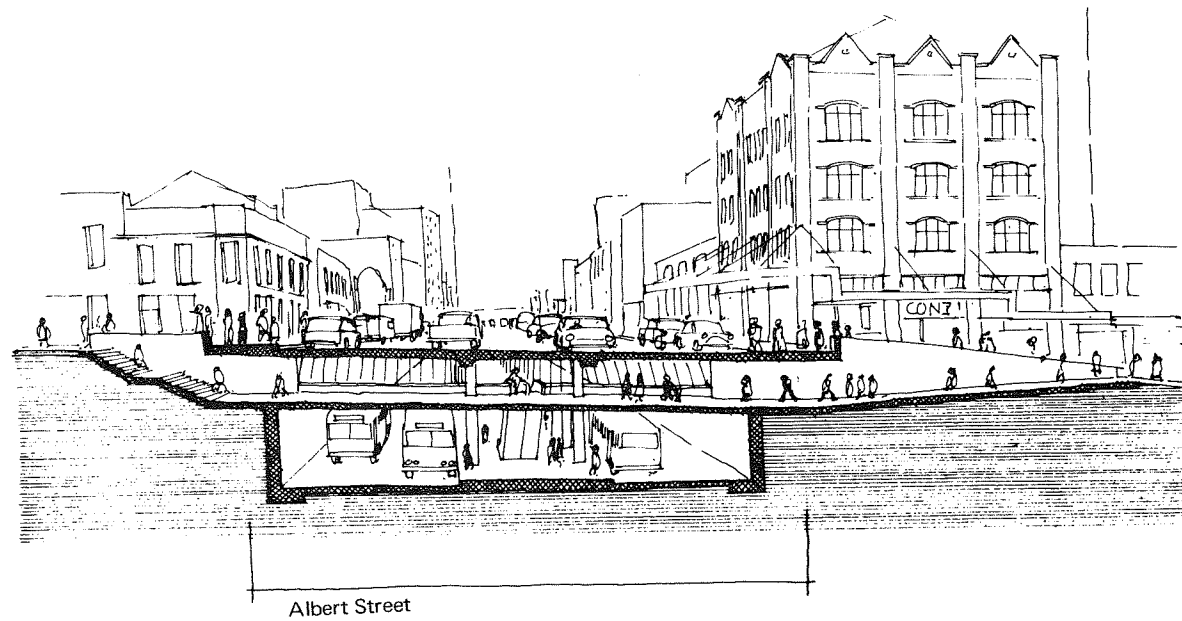


Fig. 59 Section of proposed Albert Street underground bus terminal

the loops do not penetrate as far as Queen Street, instead using Albert Street, Kitchener Street and other streets parallel to Queen Street. Shelters, seats and passenger information would have to be provided at the terminal stops, but foot-path widening would not be required as pedestrian flows in the vicinity of the terminal stops are low. A shuttle bus service would be required.

Evaluation:

In this system Albert Street and Kitchener Street are used extensively by buses, which will limit their availability for traffic movement and kerbside uses. Queen Street would not be affected by the bus routeing, and could remain as at present. Because of the use of Albert and Kitchener Streets by buses, it could be important

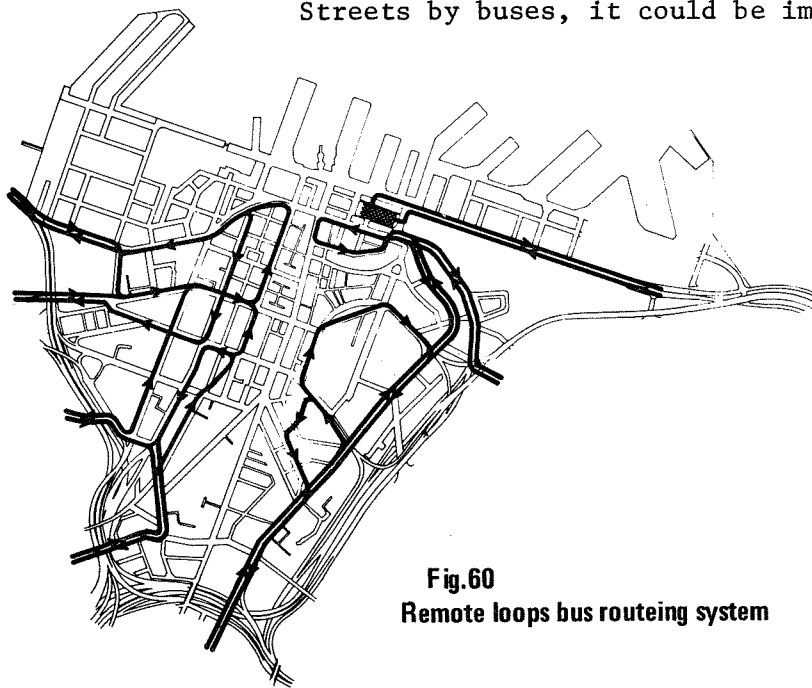


Fig.60
Remote loops bus routeing system

for Queen Street to remain a major traffic distributor.

The terminal stops are widely distributed over the Central Area, and the legibility of the system and ease of transfer between routes would not be good. Bus stops are located on streets above the level of Queen Street, and this would affect their convenience.

The cost of the system, for shelters, etc., is estimated as \$80,000.

The bus running distance within the Central Area is 2,728 miles.

The average walking distance for pedestrians is fairly high, at 697 yards.

Advantages:

- * Low capital cost.
- * Low Central Area running distances for buses.

Disadvantages:

- * Would contribute to congestion on streets peripheral to the Central Area.
- * Poor opportunities for transfer between routes.
- * Poor distribution of passengers, resulting in the longest average walking distance of any system tested.

4.7 Proposal No.5 –
 Kitchener Street underground terminal
 (Figs. 61, 62, 63 & 64)

In this scheme a linear terminal, similar in concept to the Albert Street underground terminal, is proposed underneath a new roading link running north and south from Kitchener Street. The land used would be put to multiple use, with parking or other activities in structures above the roadway, with the bus terminal in a basement below. It would be similar in operation to the Albert Street proposal, but would be more generous in the provision of passenger platforms and bus manoeuvring and layby areas.

The construction of the terminal would be part only of a major development work, and would have to be constructed in stages. The terminal would not be fully effective until all stages were completed.

Evaluation:

Like the other off-street terminal proposals, this scheme would free the street system for other uses. The terminal would provide good facilities for patrons, would allow easy transfer between routes and would be easily understood. The estimated cost of the terminal only is \$9,600,000, but the resources required to complete the whole scheme, including roadway, overhead parking and other works, is estimated at \$34,600,000. This total sum would have to be expended before the terminal complex could function.

The total running distance for buses in this scheme is 3,179 miles, high compared with other schemes. The average walking distance for patrons is 485 yards – the best distribution of any scheme tested.

Advantages:

* Streets are freed for other uses.

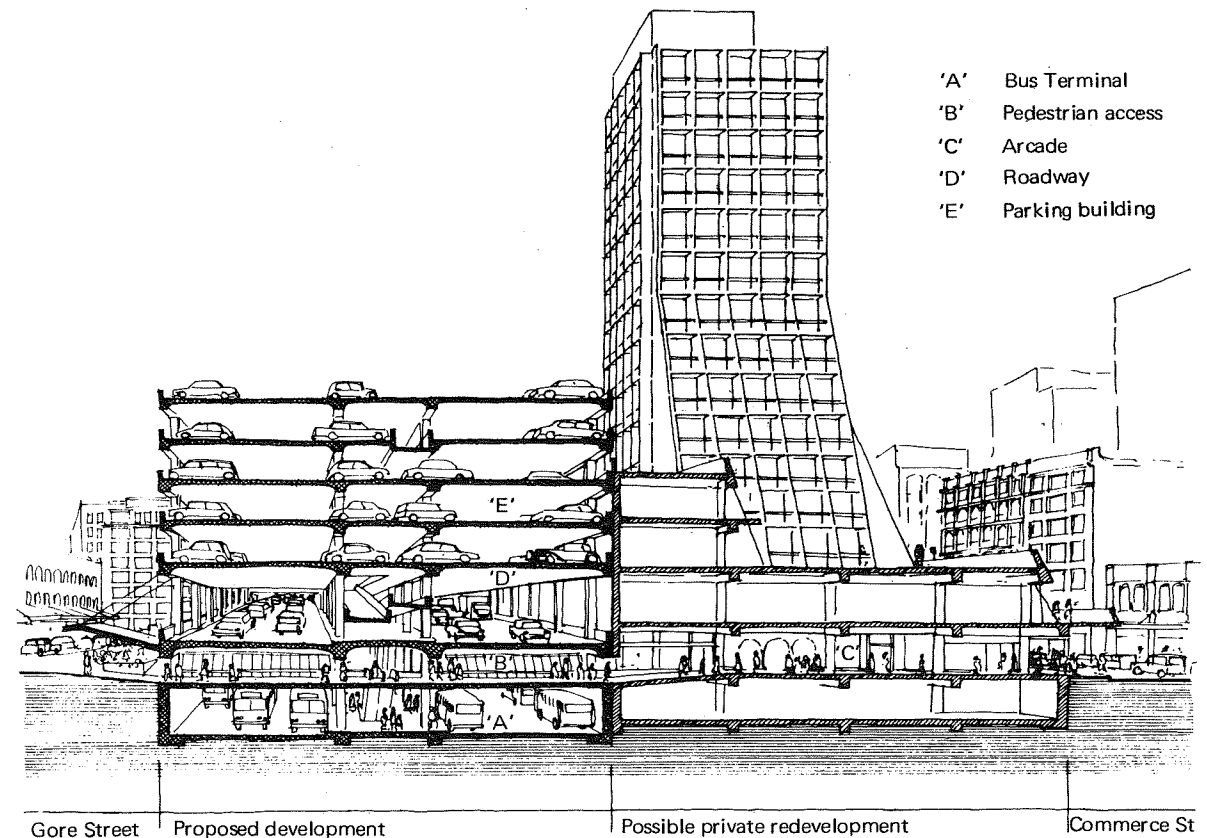


Fig. 61 Section of proposed Kitchener Street underground bus terminal, at Commerce Street

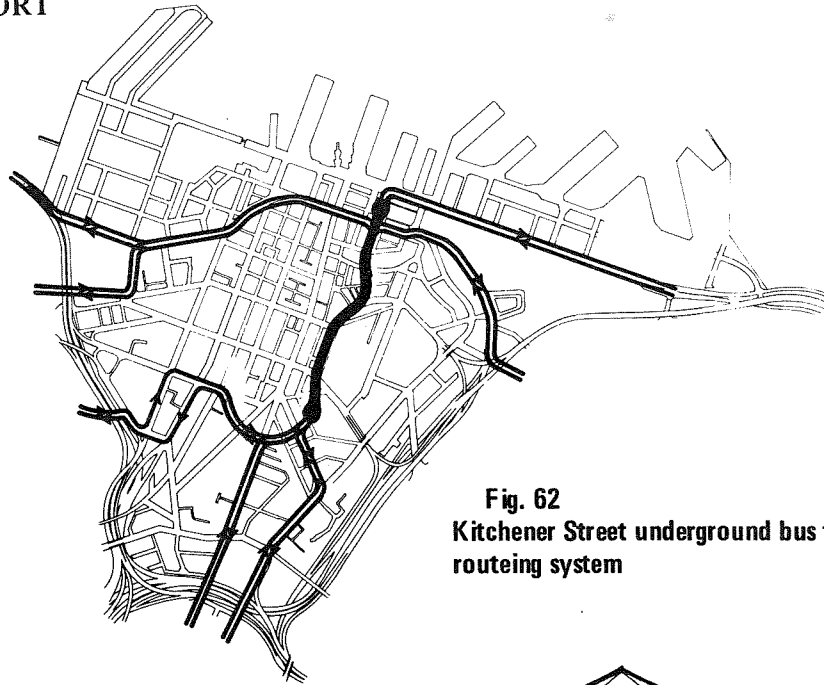


Fig. 62
Kitchener Street underground bus terminal routing system

* Simple system with good transfer between routes.

* Good distribution of passengers.

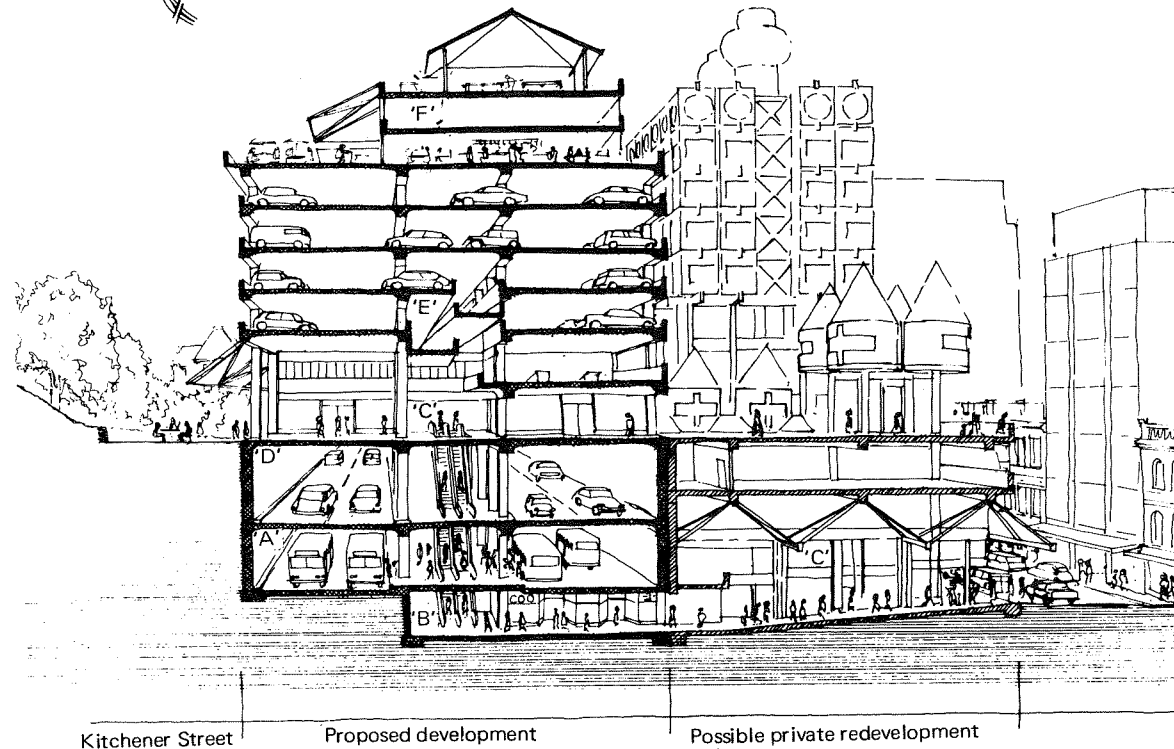
Disadvantages:

* High cost of system.

* Poor service to Hobson Street ridge.

* High Central Area running distance for buses.

* Need for stage construction giving a system which would be only partially effective for some time.



- 'A' Bus terminal
- 'B' Pedestrian access
- 'C' Arcade
- 'D' Roadway
- 'E' Parking building
- 'F' Other activities

Fig. 63
Section of Kitchener Street underground terminal at Kitchener Street

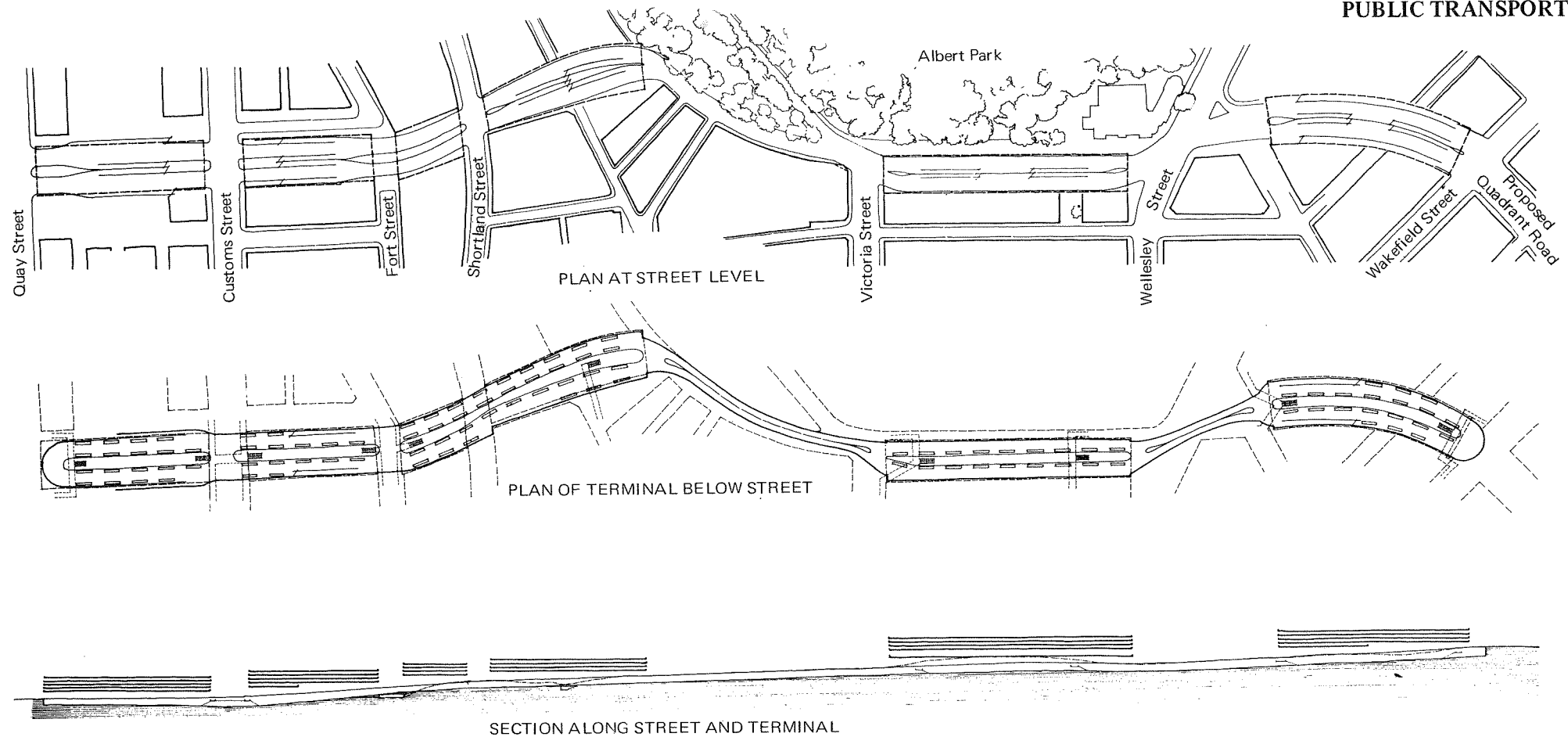


Fig. 64 Plan and Section of proposed Kitchener Street underground terminal

4.8 Proposal No.6 – Existing system (Fig. 65)

In order to be able to compare the proposed system with the present system, the present system has been included in the evaluation.

The existing bus terminal system of one terminal building and numerous terminal stops has grown with the developing transport network. Bus routes basically

follow old tram routes, and the North Shore buses were fitted in where possible. The bus terminal caters for all eastern suburbs Auckland Regional Authority buses, and private bus companies from the south. A shuttle bus links Karangahape Road, Queen Street and the Railway Station.

Poor facilities for passengers are provided at the terminal stops of most routes.

Evaluation:

The existing bus system makes use of most streets in the Central Area without heavy concentrations in any one street.

The levels of comfort and convenience of the existing system are not high, mainly due to a complete lack of terminal facilities at most terminal stops. The system is not easily understood, and transfer between routes can be difficult.

There is no cost in retaining the existing system, but the cost of improving the facilities at terminal stops to equal those of other on-street systems should be included for comparison. The cost of providing these terminal facilities is estimated as \$80,000.

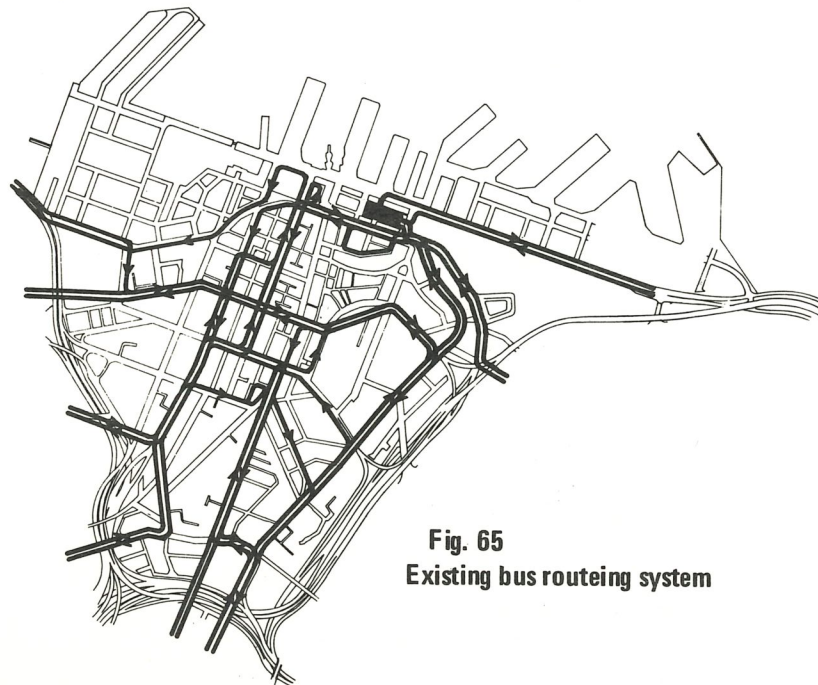


Fig. 65
Existing bus routeing system

The total running distance for buses within the Central Area is 2,996 miles.

The average walking distance for passengers is 572 yards.

The existing system has been further examined to compare the average walking distances for the various routes in the existing system. There is a wide variation in the efficiency of distribution of passengers between the various routes, average walking distances ranging from 380 yards for the Pt. Chevalier service to 900 yards for buses from the eastern suburbs using the existing terminal. It is apparent that the efficiency of distribution of the existing system could be considerably improved. Any improvements of this kind will have to be planned in detail with the Auckland Regional Authority and could be affected by re-organisation of the outer routes at present being studied.

Advantages:

- * Low capital cost.
- * Moderate Central Area running distances.
- * Already in use and would not cause patronage loss due to shift of routes.
- * Reasonable passenger distribution.

Disadvantages:

- * Makes use of streets for terminals.
- * Poor opportunities for transfer to other routes.

* System not easily understood.

4.9 Shuttle buses

Irrespective of the bus routing system adopted, or whether rail rapid transit is proceeded with, there will be a continuing need for a shuttle bus system to distribute people within the Central Area. The shuttle buses must not only distribute passengers from other bus routes, but also have an essential function in catering for trips which take place entirely within the Central Area. This is becoming increasingly important as the areas attracting large numbers of people, offices, retail, University, etc., spread away from Queen Street. Many of these within-city trips are too long for walking, and if public transport is not available, will tend to be made by private car, adding considerably to congestion in the Central Area. With the spread in development in width up the sides of the Queen Street valley, the existing linear shuttle bus service up and down Queen Street no longer caters well for many of the within-city trips.

It is not considered that the within-city trips can be provided for by the normal bus routes, which do pass through the areas requiring service.

It is not reasonable to expect the public to know which of 30 or more bus routes leaving from various parts of the Central Area will go to the required area. To cater for this sort of demand, the service provided must be frequent, must

be easily understood, so that the user is fully confident in use of the system. To do this, separate services from the suburban routes are required.

The concept of separate shuttle buses providing for trips within the Central Area must be retained. The buses used for these services should be distinctive in colour and styling. The use of mini-buses should be considered. The existing shuttle bus service should be retained, and be augmented by a service linking the Hobson Street and Symonds Street ridges. These would be two separate services, desirably using different colour buses. A suggested layout for this is shown in Fig. 66.

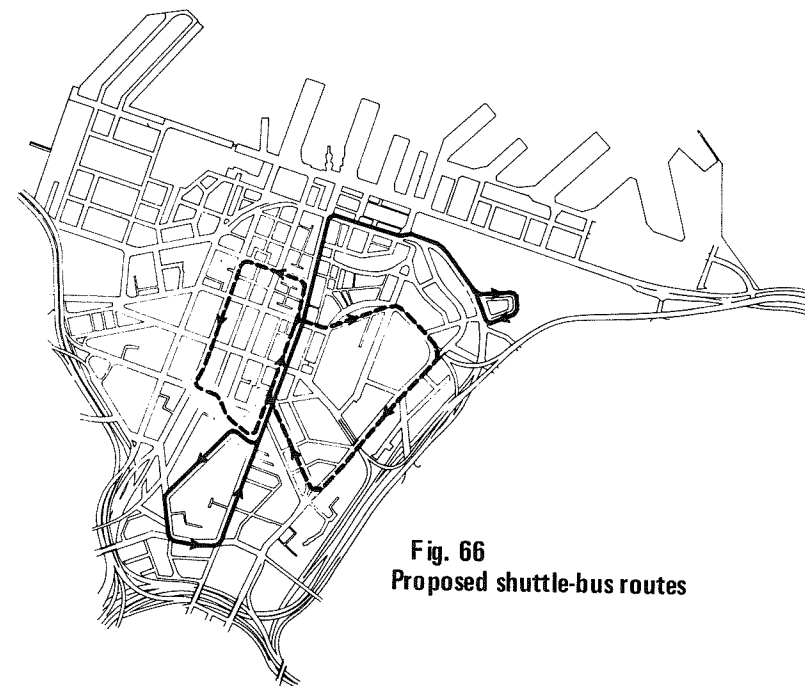


Fig. 66
Proposed shuttle-bus routes

4.10 Proposed rail rapid transit in the Central Area

Over the years a number of rail rapid transit routes into the Central Area have been proposed. DeLeuw, Cather, in 1965, recommended a spur line from the existing Railway Station, under Customs Street and Queen Street, with stations at Shortland Street and the Civic Centre. At the present time the proposals are being studied further by the Auckland Regional Authority in conjunction with the Central Government. Alternative routes within the Central Area are being studied, including a loop layout with stops under Shortland Street, Hobson Street and the Civic Centre. These routes are shown in Fig. 67.

The rail rapid transit proposals, while benefiting the central core, could

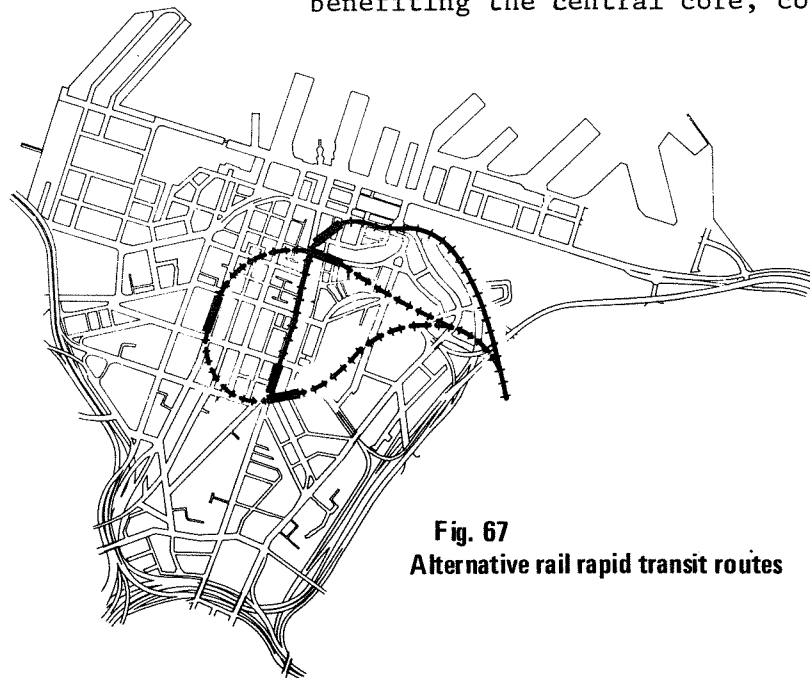


Fig. 67
Alternative rail rapid transit routes

adversely affect access to some parts of the Central Area, such as Symonds Street and Karangahape Road. These areas are at present well served by the buses passing through them on the way to their terminals. Also important is the fringe of industrial land outside the Central Area. This area attracted over 6,000 public transport passengers per day in 1963.

If a rail rapid transit system is introduced, which bypasses the area around Karangahape Road and Symonds Street and the fringe of the Central Area, it is essential that an adequate alternative public transport service be provided for distribution in the Central Area.

A full study of the merits of rapid transit rail routing is, of course, outside the scope of the Central Area Plan, but it is important to appreciate the effects different systems could have on the Central Area.

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