Outer Ring Study
Diamond Creek to Ringwood

Technical Report
Transport and Economic Evaluation

Prepared for
The Road Planning Liaison Committee
by
The Joint Road Planning Group

July 1979
FORWARD

The Outer Ring Study, Diamond Creek to Ringwood was a long term planning study carried out under the direction of the Road Planning Liaison Committee for the Government of Victoria.

The major report produced by the Road Planning Liaison Committee was the:

"Outer Ring Study, Diamond Creek to Ringwood - Environment Effects Statement, July 1979".

This statement reports on the development and assessment of a number of possible road alternatives in the study area and includes draft recommendations for the development of the future road system in the area. It was made available for public comment prior to submission to the Government for a decision.

The Environment Effects Statement is accompanied by five Technical Reports resulting from the study which was co-ordinated by the Joint Road Planning Group. These reports are:

2. "Landscape Technical Report" prepared by Scott and Furphy Engineers Pty. Ltd.,
3. "Community Response and Social Profile"(1) prepared by the Joint Road Planning Group.
5. "Noise Studies" prepared by the Joint Road Planning Group.

As well, four Bulletins were prepared and distributed to about 19,000 households in the study area and to 2,400 on the study mailing list.

(1) Incorporates, as an appendix, a report "Attitudes, Perceptions and Preferences of Residents and Non Resident Land Owners" prepared by Plant Location International Pty. Ltd.,
SUMMARY

The basic aim of the Diamond Creek to Ringwood Study was to determine the most appropriate future road system in the area between Diamond Creek and Ringwood, consistent with local and regional concerns and the environment of the area, with a view to seeking an amendment to the Metropolitan Planning Scheme to preserve the option to implement an appropriate road system some time in the future if this was considered necessary.

This technical report discusses, in detail, the transport and economic aspects of the investigation. As this study is a long term planning investigation (not a prelude to the immediate construction of a major new road), the techniques used take into account the long term implications of a range of possible travel cost policies and options and land use strategies.

THE PREVIOUS OUTER RING STUDY

The previous outer ring study was undertaken to assess the feasibility and broad regional implications of an Outer Ring transport corridor. The major conclusions reached and recommendations of the study are given in Chapter 2 of this technical report, however, the main recommendations that led to the setting up of the Diamond Creek to Ringwood Study were:

"(1) action be taken to preserve the opportunity to construct an Outer Ring Road generally following the existing Planning Scheme reservations.

(2) for the longer term development of an Outer Ring Road planning should proceed in conjunction with local Councils and with appropriate public participation on the basis of an ultimate six-lane freeway. This involves retaining existing planning scheme reservations with major amendments to the following sections:

- Boundary Road, Sunshine to Dalton Road, Thomastown
- Ryans Road, Diamond Creek to Eastern Freeway, Ringwood
- Eastern Freeway to Maroondah Highway, Ringwood.

Special attention should be given to the section between Diamond Creek and Ringwood due to the nature of the area, the absence of a Planning Scheme Reservation and the imminent development of the area in some sections."
EXISTING CONDITIONS

In order to gain a clear appreciation of the traffic implications of any alternative road proposal it is necessary, as a first step, to obtain an understanding and knowledge of the existing travel patterns and transport facilities in the area.

Road Travel

One of the major traffic restrictions at present in the study area is the limited number of crossings of the Yarra River in this part of Melbourne. This aspect was highlighted in Study Bulletin 1 in the discussion on the Fitzsimons Lane Bridge. Between 1970 and 1978 the volume of traffic using this bridge increased at an annual rate of about 11% rising from 9550 to 23150 vehicles per day over the period.

Even in recent years, the overall volume of traffic in the area has increased at an average rate of about 5-6% per year. Estimated existing traffic volumes over the screenlines are shown in Table 3.1.

Work undertaken during the previous Outer Ring Study indicated that the existing road system would need to be upgraded to provide for a smooth and safe flow of traffic in the future. If this development was not undertaken, the roads would become more congested and the likelihood of accidents would increase.

In conditions such as this, motorists attempt to by-pass points of congestion, and traffic intrusion into previously quiet residential areas is often experienced. The adverse effects of this "filtering traffic" has already detracted from the urban environment in parts of the study area.

The increased traffic in the study area has been caused by a number of factors. One of these is the growth of the population in places such as Ringwood, Croydon, Eltham and Diamond Valley. In addition to the increased number of people, the number of trips made by people has also increased. Current estimates suggest that these trends will be maintained in the near future, but that the rates of increase may later decline.

Public Transport

There are two rail and fifteen fixed route bus services operating within, through or around the periphery of the study area (see figure 3.2). These provide for city commuter travel, feeder to rail and local travel services.

The nine bus routes in the southern half of the study region are operated by the Melbourne and Metropolitan Tramways Board whilst the six
in the north are privately operated. Most of the services are located on the periphery of the study area, and only two, both between Warrandyte and the City, actually cross the region.

The major radial public transport services to the City are provided by the Victorian Railways, skirting the southern and north-western boundaries of the region.

Feeder bus services between Warrandyte and Ringwood, Park Orchards and Ringwood, Warrandyte and Eltham, and East Doncaster and Mitcham serve these radial routes and the shopping centres adjacent to railway stations.

The low residential density of the area makes the provision of bus services, the corner shop within easy walking distance of everyone, and so on, costly and uneconomic prospects. People in other areas such as Donvale, Park Orchards, Research and Eltham North are also faced with the same problems. Together with low density development and difficult terrain, few local bus services are provided, leaving the motor car as the most convenient form of transport for most.

ROAD CONCEPT DEFINITIONS

A number of road concepts were developed for evaluation by the study to determine among other things, their suitability in overcoming future deficiencies. These concepts were either developed by the study team or suggested by councils or residents of the area.

These concepts were:

Concept A (see figure 4.1)

The general improvement of selected main roads in the area to provide for local needs without specific provision for circumferential outer ring traffic.

The various proposals are essentially a continuation of the road development program currently under way in the area. Emphasis was placed on the further development of existing main roads, to service development in the area as this takes place.

Concept B (see figure 4.2)

An upgrading of selected roads in the area to facilitate both local and circumferential traffic. The focal point of this Concept is Fitzsimons Lane Bridge.

Many of the proposals under this concept were similar to those included under Concept A. The major difference lies in the emphasis that would be placed on those proposals which would provide for movement between the F5 at Diamond Creek, and the Scoresby Freeway at Ringwood.
Concept C (see figure 4.3)

A new arterial road connection, utilising some existing road reservations, but requiring a new crossing over the Yarra Valley.

Concept C extends to the east from the F5 Reservation at Ryans Road.

Concept D(1) (see figure 4.4)

A new freeway reservation to link the F5 at Diamond Creek to the Scoresby Freeway at Ringwood.

Other Road Alternatives

A number of other alternative concepts which are shown in Figure 4.5 were suggested by the public and councils and investigated by the Study Team. These included:

- A freeway connection along the S.E.C. power lines between the Templestowe Terminal Station at F18 at Watsonia. This route would traverse along the Yarra Valley instead of passing through it.
- A route from F19 along Bulleen Road connecting to the Outer Ring via the revoked F18 reservation.
- A connection from Templestowe Rd Bulleen across the Yarra in the vicinity of the Glen Iris Brick Works to the old F18 reservation just south of Lower Plenty Road.
- Investigation of Tunnel through Metropolitan Park.

Modelling Process

The modelling process used to project future travel in the study area incorporated the use of computer programs developed by the Transport Planning Division of the M.M.B.W. This method and the input data used is described in more detail in Chapter 4 of this report.

Future Population Projections and Land Use Strategies

Two estimates of future land use and population distribution was used during the Diamond Creek to Ringwood Study for the year 2000.

- Strategy 1A (Table 4.1)
- Strategy 4A (Table 4.2)

The thrust of these land use strategies are shown in Figure 4.10 and described in detail in Chapter 4 of this report. They are however described briefly below.

(1) This concept was eliminated from further investigation by the government early in the study on advice from R.P.L.C.
Strategy 1A - This strategy assumes that land use zonings as contained in, or proposed as amendments to, the Metropolitan Planning Scheme will be utilised.

Strategy 4A - The main thrust of urban growth in Strategy 4A is towards the north and west of Melbourne, in particular towards the satellite towns of Melton and Sunbury where households numbers are expected to increase. It also assumes some further higher density redevelopment of the inner and middle suburbs.

Year 2000 Travel Demands

As development takes place in the study area in accordance with land use zonings provided for within the existing Metropolitan Planning Scheme, added demands will be placed on the road system.

Because of the planning nature of this study, and of the need to test a large range of variables, techniques to analyse future traffic on a screenline basis were used.

Traffic volumes across screenlines (see figure 3.1) for each road concept using the basic assumptions that:
(a) fuel prices will double in real terms and
(b) land use strategy 1A will be implemented are shown in Table 5.3.

However, where it was necessary to discuss individual road volumes such as for noise estimates and the determination of exhaust emissions, these are quoted in ranges of 10,000 vehicles per day. Ranges have been used to take into account any uncertainties of personal choice or travel cost in the selection of travel paths through the road system. Individual road volume ranges used for noise and exhaust emission estimates are shown in Figures 5.1 to 5.4.

By using the trip generation and attraction rates, land use data, vehicle availability and travel cost parameters discussed in Chapter 4, the year 2000 travel demands for each alternative road concept were determined.

The number of extra vehicle trips per day generated by each road concept when compared with Concept A are:

<table>
<thead>
<tr>
<th>Concept</th>
<th>Extra Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept B</td>
<td>2000</td>
</tr>
<tr>
<td>Concept C</td>
<td>4000</td>
</tr>
<tr>
<td>Concept D</td>
<td>5000</td>
</tr>
<tr>
<td>F18-Bulleen Rd</td>
<td>1000</td>
</tr>
<tr>
<td>Powerline Route</td>
<td>3000</td>
</tr>
</tbody>
</table>

Each of the alternative concepts serves predominantly local traffic with
long distance through circumferential traffic comprising up to 15% of the total volume on the route. That is to say, 85%, or greater, of the traffic on the route has its origin or destination, or both, within the study area.

Road System Deficiencies

Probable future deficiencies in the road system for each concept examined were determined by comparing the predicted future traffic flows with the possible traffic carrying capability (or planning capacity) on a daily basis. If the predicted traffic flow is divided by the planning capacity, an indication is given of the congestion levels across each screenline. This congestion level is useful for comparing the traffic performance of the various road networks investigated in this study, and for identifying likely future problem areas in each case.

Table 5.3 shows, that for the screenlines within the study area (1, 2, 3, 5 and 7 shown on figure 3.1), congestion levels are reduced from those estimated for Concept A as the degree of development becomes greater. Concept B gives general decreases in congestion levels over the study area except for the crossings of the Yarra River (and their approaches). Concept C, by the addition of a further major crossing point, also solves this problem, as would Concept D, the F18-Bulleen Road route and the route along the Yarra Valley S.E.C. powerlines.

Sensitivity Testing

A change in the land-use, travel cost (fuel prices) and base road network assumptions, may reduce demands across the screenlines and either lessen the need for road improvements or extend the time at which they might be introduced. The impact of these changes is discussed briefly below, in Chapter 5 and in the Appendix of this report.

Changes in Travel Cost

To test the sensitivity of a quadrupling of 1978 fuel prices, estimates of traffic flow were prepared on a screenline basis for Concepts A and C and the results compared with the base case of doubling 1978 fuel prices. Table 5.5 in this report shows the comparison of screenline flows and indicates that the outcome of quadrupling fuel prices on their own could have the effect of reducing traffic volumes by approximately 14% and congestion ratios across screenlines to levels where any improvements over and above Concept A by the year 2000 could be difficult to justify on traffic grounds alone.
Changes in Land Use

A comparison between strategies of the traffic volumes generated over a series of screenlines is shown in Table 5.6 for Concept C. Analysis shows that an overall average decrease of about 4.5% in traffic volumes across the screenlines under Strategy 4A would occur. Similarly a decrease of approximately 4% in vehicle kilometres travelled within the study area could be expected with a corresponding 6% increase at the metropolitan level.

It is of interest to note however that because there would be less development south of the study area and more to the west under Strategy 4A, there would be less travel through the area, but more trips between the northern suburbs and the study area than that generated with Strategy 1A (i.e. increased trips over screenlines 9, 10 and 11) making the situation worse under Strategy 4A in these areas.

Combination of Increased Travel Costs and Land Use Changes

The combined impact of both quadrupling the 1978 price of petrol and restraining development of the fringes of the Metropolitan Area with more emphasis placed on peripheral growth in the west and north, could result in an approximate overall reduction of 18% in study area road travel. Under these circumstances, the need for improvements to the road system beyond those proposed under Concept A may therefore be unjustified on traffic grounds alone by the year 2000. However, the uncertainty of future changes in factors such as quadrupling petrol prices and major changes in land use development trends makes it difficult to use these figures as the basis for an argument not to make provision for future travel.

Other Road Networks Tested

To obtain the indication of how variations to the base road network assumptions would change the future traffic levels on concepts B and C, two basic alternative assumptions were tested. These network variations are described in Chapter 5. An example tested is the assumption that the Eastern Freeway would not be constructed to Ringwood by the year 2000.

It was concluded that variations in the base road network assumptions do not significantly alter basic North/South and East/West capacity demands in the study area enough to have major effects on road concepts so far considered.
Changes in Accessibility

Accessibility can be defined as a comparative measure directly proportional to the number of jobs (or shopping centres or households) in other areas and inversely proportional to the cost of travel between them. A zone has a higher accessibility than other zones if more jobs and households can be reached at lower travel costs when compared to other zones.

Accessibility to social activities is considered to be an important determinant in the individual's decision to locate a household at a particular site.

Of particular importance also is the accessibility of a location to workplaces, for both white collar jobs and blue collar jobs.

Increases in accessibility are caused by a reduction in congestion levels on the road system as a whole, thereby reducing travel times and costs. Generally, new road facilities tend to show greater increases in accessibility than improvements to existing facilities.

Concepts B, C and D each show improved accessibility to jobs (compared to Concept A) over most of the metropolitan area but to varying degrees. There are no decreases. The highest increases occur in and near the study area where access to the possible new road facilities is provided. Concept D shows the highest increases and, generally, the new freeway concepts provide higher accessibilities than the new arterial Concept C followed by Concept B which involves improvements to the existing road system.

Changes in job accessibility patterns for each concept are shown in Figures D1 to D10 in the appendices to this report and the effects of increased accessibility are discussed in Section 5.3. It can be concluded that increased accessibility will only have a marginal affect on pressures for development in the study area.

Public Transport

Previous Outer Ring Study - During the course of the previous Outer Ring Road Study, Public Transport demands were considered in some detail. The conclusion reached was that the construction of a public transport heavy rail facility along the outer ring corridor would not be economically justified.

Patronage levels determined during the previous study for an outer ring service (ie. 1000-2000 passengers per two hours, two ways) could be well satisfied by a bus system operating at average headways of between 5 and 10 minutes (assuming 40 passengers per bus).

Aspects Evaluated in this Study - Having established during the previous Outer Ring Study that a public transport service could operate as an integral
part of a road facility, further detailed analysis of this aspect was not
carried out during the Diamond Creek to Ringwood Study. Instead its existence
was one of the base assumptions for transport modelling and evaluation
procedures.

Additional considerations given to Public Transport during the study
were concentrated on the development of facilities to provide a local service
function for study area residents.

For Concepts A and B, the most suitable road based public transport system
that could be provided would be an extension of the present bus system acting
as a feeder system to railway stations and other town and regional centres.

Under Concepts C and D this system could be extended to provide local
and express services because of the relatively lower levels of congestion on the
road system brought about by the introduction of a new road facility. The
express services would use the new road for those circumferential movements
that could not be attracted to the public transport system if Concepts A or
B were adopted. Because of the limited number of access points to the new road
under Concept D, the extended bus services would include more express and
less local services than Concept C.

Under all concepts, these services could be provided using conventional
buses, however, in those areas where an inadequate level of service or no
service is provided by a conventional public transport system, a demand-
responsive mini-bus system may be better suited.

Other improvements to the public transport system in the study area
include the proposed construction of the Eastern Railway to Blackburn Road
and the associated transport interchange facilities. This will not, however,
service the area north of the Yarra River under Concepts A and B, but could
be directly linked to express services possible under Concepts C and D.

Future bus services could be focused on the main Eltham, Greensborough and
Ringwood Shopping Centres during the day with increased or added emphasis
toward railway stations during peak periods.

Mini-bus type services could supplement the more conventional bus
services which are possible and viable only in areas of higher residential
density and less rugged terrain.

Possible and/or proposed public transport services in the study area
which primarily service local mode transfer stations, provide a local service
function and serve dispersed job locations are shown in Figure 5.6.
ECONOMIC EVALUATION

In the economic analysis only those aspects that could be quantified and costed were considered.

The economic evaluation of user costs and benefits for the alternative concepts were calculated using a modified version of the Commonwealth Bureau of Roads program "USRBEN". The program, as used in the Outer Ring Study, has been modified to include an evaluation of accident statistics on a comparative basis for the alternative concepts. By generating and assigning separate trip patterns for each concept (as estimated by using computer models developed by the M.M.B.W. and Ministry of Transport), the calculation of user costs and benefits, allowing for generated trips and those trips which change destinations as a result of increased accessibility, can be made.

Evaluation of User Costs and Benefits

The calculation of daily road user resource benefits discounted to 1977 are described in Chapter 6. These are shown in the Table below. The resource benefits are the savings in travel time, vehicle operating cost and accident costs over and above Concept A.

**Daily Road User Resource Benefits ($/day)**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Daily Road User Benefit (compared to Concept A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>34,600</td>
</tr>
<tr>
<td>C</td>
<td>50,000</td>
</tr>
<tr>
<td>D</td>
<td>57,500</td>
</tr>
<tr>
<td>F18-Bulleen Road</td>
<td>32,900</td>
</tr>
<tr>
<td>Powerline Route</td>
<td>49,900</td>
</tr>
</tbody>
</table>

Distribution of Benefits in Study Area

An investigation of where derived benefits are distributed indicated that those concepts that lie entirely in the study area accrue greater than 50% of the whole metropolitan area benefits. These benefits apply to the study area residents who make up only 7% of the metropolitan area population by the year 2000. Traffic analysis has also indicated that approximately 15% of all traffic on the Diamond Creek to Ringwood section of the outer ring road has both origins and destinations outside the study area, i.e. the route would serve an important local service function. Those concepts that lie to the west and south of the study area accrue less benefits to the residents of the study area because these routes serve less of a local service function.
Accidents

In determining accident costs it was necessary to estimate the number of accidents likely to occur for each road concept. This work indicated that the freeway concepts had the greatest net impact in reducing accidents on the road system with the new arterial road concepts having the next greatest impact. Considering safety alone the concepts could be ranked as follows:

1. Powerline Route - Best
2. Concept D
3. Concept C
4. F18-Bulleen Road
5. Concept A

Benefit/Cost Ratios and Net Present Values

In determining benefit cost ratios and net present values, certain assumptions were necessary with respect to:

- Construction Start Year (1995)
- Distribution of Construction Costs (equally distributed)
- Growth of benefits
  - During Construction (0 to full value)
  - After Construction (2% for 20 years)
- Discount Rate (10%)

Details of how Benefit Cost ratios and Net Present Values were calculated are discussed in Chapter 6. The impact of how changes in the assumptions previously mentioned affect the economic viability of each concept is discussed in the Appendix.

The economic analysis showed that, on the basis of benefit/cost ratios, Concepts B, C and the F18-Bulleen Road Route are on a par and better than all other concepts, however, on the consideration of net present values, Concept C is best.

Sensitivity Testing of Assumptions

Because benefits and construction costs occur over a time period and construction start year, period of construction, the period of acquisition and other factors are uncertain, several assumptions have been made about these factors in calculating benefit/cost ratios for the alternative road concepts. The testing of how variations in these factors affect the economic viability of alternative concepts indicated no change in preferences. This is discussed in more detail in this report and appendices.
Benefit of Retaining the Option

A further area of economic benefit examined during this study was that of "retaining-the-option" of constructing a new route some time in the future between Diamond Creek to Ringwood. The major difference between this and the conventional economic analysis discussed earlier is that total land acquisition costs are not considered but only those costs required as the need arises to pay compensation on properties affected by any future possible planning scheme amendment. Compensation payable would be that required under the Town and Country Planning Act and could amount to between 20-50% of total land estimated acquisition costs over the next 15-20 years.

If this action was to be adopted, major land acquisition would be made as late as possible, after a decision to exercise the option to construct a new road was taken. Prior to this, only those relatively small amounts required for compensation in the interim would be outlayed.

The sensitivity analysis presented in the Appendix indicates that the acquisition start year has very little effect on the economic viability of a project. However, if land is purchased over a very short period immediately after a reservation is incorporated in the Planning Scheme, then its economic worth would be decreased. If the land is purchased however over a short period, but closer to construction date, then there would be very little change in the economic viability of the project. The impact of this latter approach is not significant enough to vary the order of economic preferences of road concepts so far developed.

Based on economic analysis alone, the alternative concepts could be ranked as follows:

1. Concept C - best
2. Concept B
3. F18-Bulleen Road Concept
4. Concept D
5. Powerline Route Concept

CONCLUSIONS

The freeway concepts rank the highest in terms of traffic performance, accessibility and safety followed, generally by the new arterial road concepts and improvements to the existing road system last. Marked
changes occur in this ranking when the economic costs and benefits are considered. Each alternative concept yields different benefits in terms of travel time savings, vehicle operating cost savings and accident cost savings but each concept is vastly different in terms of implementation cost. Because the Government is constrained by limited resources, the economic worth of the alternative concepts is of considerable importance. It may be argued however by some that traffic performance, accessibility and safety are equally important and that the cost to implement the concepts which rank high in these areas should be borne by the community at large.

As explained in the Environment Effects Statement, Concept D (the freeway connection), the F18-Bulleen Road connection, the route along the S.E.C. powerlines between Templestowe and Watsonia, and the proposition for a tunnel under the Yarra River have all been rejected for a variety of reasons.

All road concepts are economically viable, however, of the remaining concepts, Concept C has the highest ranking in terms of traffic performance, accessibility to and from the study area, safety and economic attractiveness, and is preferred to both Concept B and Concept A. Concept B in turn is preferred to Concept A.

Traffic performance, accessibility, safety and economic worth are only four of the many factors considered in the overall assessment by the Road Planning Liaison Committee and the Government before recommendations and a final decision are made. These and the many other factors are described and put in context in the main Environment Effects Statement.
STUDY AREA

Legend
- Current or Proposed Major Road
- Possible Future Major Roads
- Distribution Area for Bulletins

SCALE 1:100 000

Figure 1.1
CONCEPT A

Legend
- Current or Proposed Major Road
- --- Possible Future Major Roads
- Concept A Roads.

SCALE 1:100 000

Figure 4.1
Legend

- Current or Proposed Major Road
- Possible Future Major Roads
- Concept C Roads.

Figure 4.3
CONCEPT D

Legend
- Current or Proposed Major Road
- Possible Future Major Roads
- Concept D Roads.

Figure 4-4
OTHER CONCEPTS

Legend

- - - - Current or Proposed Major Road
- - - - Possible Future Major Roads

Figure 4.5
4.1.5 Other Road Alternatives

A number of other alternative concepts which are shown in Figure 4.5 were suggested by the public and council and investigated by the Study Team. These included:

- A freeway connection along the S.E.C. power lines between the Templestowe Terminal Station at F18 at Watsonia. This route would traverse along the Yarra Valley instead of passing through it.
- A route from F19 along Bulleen Road connecting to the Outer Ring via the revoked F18 reservation.
- A connection from Templestowe Rd Bulleen across the Yarra in the vicinity of the Glen Iris Brick Works to the old F18 reservation just south of Lower Plenty Road.
- Investigation of Tunnel through Metropolitan Park

The latter two alternatives were not subjected to individual transport and economic assessment but were likened to other concepts where possible from the transport operational point of view. The tunnel alternative was subject to a brief economic appraisal only and the results are described in Chapter 6.
7.0 CONCLUSIONS

Each of the alternative concepts has been examined and ranked according to traffic performance (Section 5.5), accessibility to and from the study area (Section 5.3), safety in terms of accident rates (Section 6.3) and economic worth (Section 6.10). These rankings are summarised under these headings in Table 7.1.

The freeway concepts rank the highest in terms of traffic performance, accessibility and safety followed, by the new arterial road concepts and improvements to existing road system last. Marked changes occur in this ranking when the economic costs and benefits are considered. Each alternative concept yields different benefits in terms of travel time savings, vehicle operating cost savings and accident cost savings and each concept is vastly different in terms of implementation cost. Because the Government is constrained by limited resources, the economic worth of the alternative concepts is of considerable importance, however, it may be argued by some that traffic performance, accessibility and safety are equally important and that the cost to implement the concepts which rank high in these aspects should be borne by the community at large.

Traffic performance, accessibility, safety and economic worth are only four of the many factors considered in the overall assessment by the Road Planning Liaison Committee and the Government before recommendations and a final decision are made. These and the many other factors are described and put in context in the main Environment Effects Statement.

Early in the study the Road Planning Liaison Committee advised that, in their opinion, a freeway connection between Diamond Creek and Ringwood (Concept D) could not be recommended because:-

1. It would have a major impact on the area through which it would pass
2. It has very little community support
3. It has less economic justification than other non-freeway alternatives.

The Government previously decided to remove the F18 Main Road Reservation from the Planning Scheme between the Eastern Freeway and Lower Plenty Road. The F18 Bulleen Road Concept would require part of the revoked reservation to be reinstated and would have a detrimental effect on property along this section. Transport analysis carried out by the Study Team demonstrates that this suggested link would not significantly cater for the demand for
circumferential movement through the study area and would not therefore solve the problems that will evolve under Concept A. It would cater mainly for radial traffic to and from the Eastern Freeway and would have little affect on the need for the development of a ring road further east.

The Power Line Route was comparable on all factors to the rejected freeway alternatives. In particular, it would require a large number of houses in Macleod and Watsonia, and cause severe damage over a long length of the Yarra Valley between Lower Plenty and Warrandyte.

For these reasons, the Road Planning Liaison Committee rejected Concept D, the Fl8 Bulleen Road Concept and the Power Line Route as desirable solutions.

Of the remaining concepts being considered Concept C has the highest ranking in terms of traffic performance, accessibility to and from the study area, safety and economic attractiveness, and is preferred to Concept B. Concept B in turn is preferred to Concept A.