Investment Options for Urban Public Transport

Paul G. Hooper

ABSTRACT

Investment decisions aimed at improving personal mobility within urban areas, at present, are made within a choice horizon that is unnecessarily constrained. There exists a whole range of options that are either not considered or not elevated to the right order of priority. Historically-determined divisions of responsibility, the dominance of 'the transport plan' approach, and the way in which projects are financed, dictate the types of options that will be considered. The decisions that are made quite often reflect mode-specific perceptions of the problems involved. There is a need for a consideration at the strategic level of the problems that exist and the range of options open.

INTRODUCTION

The issue under consideration in this paper is the selection of appropriate investment options to improve urban passenger transportation facilities. Since the range of options varies as widely as from construction of a freeway system at a cost of hundreds of millions of dollars to a campaign to increase average car occupancies to extract greater use of existing roads, the process of generating transport proposals is a matter of some significance.

Broadly categorizing investment options, two types can be distinguished. That is, those that add substantially to existing transportation facilities, and those that aim to make better use of, or add only small increments to, existing facilities. The former typically involve large expenditures and require a great deal of pre-planning. The latter group does not require such large outlays and are capable of implementation after a minimal gestation period. The relative merits of each type ought to be taken into account in the formulation of transportation planning strategies. To consider whether, in fact, this is done, let us examine the investment proposals submitted by the State Governments for approval for financial assistance under the States Grants (Urban Public Transport) Act 1974. This Act authorizes payments from the Consolidated Revenue Fund of the Australian Government to the various State Governments for approved projects. The assistance granted is based on a formula of two-thirds outlay by the Australian Government and one-third outlay by the relevant State Government. A project is defined in the Act as one that is designed "..to improve the quality, capacity, efficiency or frequency of the public transport system at a major city".[1] The Act does not provide assistance for the operating deficits of State Government public transport operations, and nor does it provide assistance to private suppliers to public transport services.

Table 1 illustrates the emphasis placed on the different categories of investment options by the States in their submissions for the 1973-74 investment programme. The greater part of these proposals is for rail projects, being 79 per cent of the total. Quite clearly, the amount of investment proposed for small-scale, incremental projects is of a very low order. This is not to say that the projects submitted were not warranted. Indeed, after detailed evaluations by the Australian Government assistance in excess of $31 million to aid these projects was approved under the Act. However, the States' programmes were

1 Major cities are defined to include Sydney, Melbourne, Brisbane, Adelaide, Perth and Hobart.

based largely upon the recommendations of the various transportation studies carried out for them in the 1960's and early 1970's. The approach taken in these studies was to forecast for some period in the future and to propose plans to meet future needs. There is little evidence to suggest that the comprehensive, multi-modal approach adopted in these studies has been applied in planning for incremental improvements to extract better use from existing facilities in the short term.

There exists a wide range of investment options that can provide small increments to the existing transportation infrastructure. Typically these have short gestation periods to implementation and involve relatively small capital outlays. Extensive market research and experimentation has occurred with them in recent years in overseas countries. This experience has made it possible to predict, with a high degree of confidence, the results of each when applied in particular circumstances. In each case the benefits claimed are not immense, but the combined impact of a concerted planning effort promises to be substantial. The flexibility afforded by the range, encompassing a large number of mutations of basic technology, enables the planner to cope with the varying situations and evolving needs likely to be encountered. What follows is a discussion of a representative selection from this range to draw increased attention to their potential.

CAR POOLING

This measure aims to increase car occupancy rates, particularly for the journey to work. Typically these are of the order of 1.5 persons per vehicle, and even less during peak hours. Certainly much excess passenger-carrying capacity exists. If efforts to encourage car pooling are even moderately successful, many obvious benefits will follow.

There are four basic versions of car pooling. These are:

(1) Roster schemes;
(2) Expense sharing;
(3) Fare charging; and
(4) Company vehicle schemes.

The first is an arrangement whereby the members use their own vehicles on a roster basis. No exchanges of money take place. This form of pooling does not contravene the law and does not appear to create any problems with insurance. Membership of a pool would be restricted to those cases where the degree of car availability is high. The second scheme requires that members of the pool contribute enough money to cover all, or part, of the total costs incurred by the driver. In some States this arrangement is illegal at present and problems with insurance are encountered. An extreme case of expense sharing occurs when the driver sets a fare and operates something like a multiple-hire taxi on the journey to work. This arrangement puts the car in the class of a commercial vehicle for which permits would be required. The position that insurance companies would adopt in this case would have to be considered. A good example of the fourth type of pooling is that operated by the 3M company, Minneapolis, U.S.A. This company has provided 25 company-owned vans. The employee-driver of the van has personal use of it, free travel to work, and the permission to keep fares beyond the seventh passenger.

One of the major obstacles that would be confronted would be the lack of information on potential pool members. A substantial data gathering effort would be required to provide the basic origin, destination and time information. Computer models are available that can undertake the matching of drivers with passengers. A significant advertising campaign would be required to demonstrate the advantages of pooling. Incentives of many kinds have been used in the U.S. Preferential treatment in allocating parking space to car pool vehicles, reduced tolls on bridges, use of special lanes set aside for buses and car pools on heavily congested routes, and bonuses to pool members have all been tried. At the same time disincentives to non-pool vehicles have been implemented.

The community at large would benefit from a concerted car pooling campaign by reducing the amount of traffic congestion, reducing vehicle emissions, and conserving fuel. Pratsch estimated that an increase in auto occupancy by 30%, an amount he considered well within the bounds of feasibility, would lead to a 22% reduction of vehicle miles travelled in commuting (Pratsch, 1974). The sensitivity of speed to demand is great during peak hours on congested roads. Relatively small decreases in demand can yield proportionately greater increases in overall travel speeds. The savings in travel times and the possible postponement of new road construction would be substantial social benefits. Pratsch cited a Washington study where it was claimed that a 20% reduction in travel demand caused an 80% increase in average arterial speeds. The implication of this for reducing the polluting emissions from autos alone is staggering. The increase in speeds, together with a reduction in the number of vehicles, would produce a 52% reduction in CO emissions. It was also claimed that a 30% increase in car occupancy during peak hours would lead to a saving of 5% of the total highway fuel consumed. A 10% shift of auto mileage to buses would yield a saving of only 3.5%, this requiring a 100% increase in bus patronage. An increase in vehicle occupancy would relieve some of the critical parking problems confronting authorities and private enterprise. Individuals would gain through reduced commuting costs. Furthermore, in one car/two driver families, the car would be released for use in the off-peak for other journey purposes, especially for shopping trips.

Pratsch estimated that a comprehensive car pool program aimed at increasing car occupancy by 10% would return an annual ratio of benefits to costs of a staggering 47 to 1. No capital costs would be required. Operating costs were estimated at $1 (U.S.) per auto commuter, 25% of this being required for data processing. The remaining 75% would account for overhead, public information and incentive costs. A recent study undertaken for the Australian Department of Transport estimated that between 5% and 10% of drivers without passengers commuting to the inner regions of Melbourne (greater than 100,000 persons at present) could be enticed to enter car pools (Australian Department of Transport, 1974). This would remove between 10,000 and 25,000 cars from the roads during peak periods.

PARK AND RIDE

The practice of providing more adequate facilities at railway stations with severe parking problems is not unknown in Australian cities. These facilities appear to have been provided in response to critical parking problems that have already existed, rather than as part of a total strategy of effecting transport improvements. The issues that recur are mainly to do with responsibility for the provision of the parking space. Conflicts have arisen between local government and railway authorities. The ability of park-and-ride policies to attract patronage to line-haul services should not be underrated. However, the benefits that would accrue to the line-haul operator are not the only ones and need not be the most significant.

The intention of park-and-ride is to encourage car-using commuters to only use their vehicle for a portion of their trip, the remainder being made on a line-haul service. Parking facilities are usually provided at railway stations.

Another version operates by providing parking spaces on the fringes of the CBD with shuttle bus services taking commuters for the remainder of the trip. The Department of Transport (U.S.A.) has encouraged the use of mini-parks at freeway interchanges for the use of commuters joining continuing car pools or buses. A further variant goes under the heading of "Kiss-and-Ride" where encouragement is given to the practice of using the family car for depositing (and collecting) commuting members of the family at the station. The vehicle is returned to the home during the day.

The benefits associated with a campaign to increase the use of park-and-ride are dependent upon the ability to attract car users to rail and will be greatest where the car users are attracted away from heavily congested roads and where pressures on destination parking capacity are severe. If the sole effect is only to encourage existing users of public transport to drive to the station, a net social loss may even occur. Included in the benefits are increased travel speeds for traffic remaining on the roads, reduced volumes of emissions of noxious gases, and reduced usage of oil.

BUS SERVICE IMPROVEMENTS

Traditionally, heavy reliance has been placed on bus services to perform the task of transporting people in urban areas. In fact, over 70% of all public transport users in the United States are bus patrons. However, trends in Australia have shown declines in patronage for most journey purposes. This should not be construed as evidence to the effect that buses will not be able to attract, or at least maintain, patronage in the future, but rather that the role of buses will need to change in order to do this. In its traditional roles, the bus has lost patronage to other competitive technologies, except in specialized applications such as school charter. Progressive operating and marketing policies in some cities have shown these trends need not continue. The bus is a technological option capable of much variation and, as such, it is flexible enough to adapt to present and evolving needs. It is of interest to note the view of the former Minister for Transport, the Hon. C.K. Jones, on this point: "Unglamorous and inadequate as they now are, the bus represents a highly promising mode of urban transport. The reason is that buses have the flexibility to go almost anywhere" (Jones, 1974).

For comparatively little capital outlay, better use can be extracted from the existing transportation infrastructure. Road space can be utilized more effectively by introducing measures that facilitate the flow of person trips rather than vehicle trips, whilst more use can be made of existing rail, tram, and ferry services by making them more accessible to potential users with suitable bus feeder services. At the same time there is much scope for improving the quality of service. Travel times can be reduced. Bus travel times are largely a function of the physical layout of streets, the number of passengers boarding and alighting, the method of fare collection, and the amount of other traffic on the roads. Valuable time savings can be produced by measures directed towards these areas. Design standards for new streets, or improvements to existing ones, ought to take particular account of the needs of buses. Turning problems at intersections, the need for bus stop bays, and the design of street patterns that do not require unnecessary circuitous routing, are all areas that could receive more attention. Interchange facilities can be designed to facilitate transfers and reduce boarding and alighting delays. Bus design can also be improved to achieve similar results. Fare pricing systems can be designed, consistent with the theoretical requirements of a rational pricing policy, that are simple in construct and are easy to operate in practice. Bus lanes and bus priority measures can substantially reduce delays to buses due to congested traffic conditions. Most of these measures would also produce favourable impacts on the comfort, convenience and reliability attributes of bus services. It is becoming clear from recent research into trip making behaviour that these factors are rated as very important in the choice process. Measures that increase the probability of obtaining a seat, reduce the probability of delays, and reduce walking distances and transfer difficulties are likely to produce significant effects on demand. Probably one of the greatest problems for bus operators is that of having much excess capacity sitting idle for most of the day. Since wages and salaries account for between 50% and 70% of total costs, measures which can achieve economies in the use of labour will effect great cost reductions.

EXCLUSIVE BUS LANES

On congested freeways and inner urban arterials, significant delays are imposed on buses by other traffic. The low speeds encountered under these conditions also impose higher operating costs on buses. By allocating exclusive use of certain lanes on arterials and freeways, or exclusive use of segments of streets within inner urban areas, significant benefits can be realized. Such is the potential of schemes of this nature that over 200 programmes have been initiated throughout the world. Relatively few schemes have been discontinued.

Freeways, or major arterials, carrying large volumes of buses, and other traffic, to the CBD are potential candidates for exclusive bus lanes. These lanes can be either with-flow or contra-flow and may, or may not, be separated from other traffic with physical barriers. In some cases the bus lane can be constructed in the median strip. Obviously the design of these measures can best be carried out in the planning phase of freeway construction. This does not imply that existing arterials and freeways are not suitable as candidate projects. As an example, a bus lane has been set aside along Military Road in the Mosman area of Sydney to speed up city-bound traffic. Another possibility is to construct busways alongside railways lines in unused easement space. Multiple use of this space ought to be considered. Exclusive bus only streets may be appropriate within major centres where congestion is severe and the conflict between pedestrians and traffic is great. Benefits to bus users and pedestrians may be realized.

Experience in allocating freeway space exclusively to buses is greatest in the U.S.A. One project involved the allocation of a 3.3 metre wide contra-flow lane on an approach to the Lincoln Tunnel on New Jersey route 1-495, where bus volumes of 500 per hour during the peak period were reported. Average bus speeds of 60 to 65 Kilometres per hour were possible. Much higher speeds (up to 110 k.p.h.) were experienced on Californian freeways. The design of the bus lanes there was more sophisticated. Wide buffer strips, 5 metre wide contra-flow lanes, and off-roadway space for breakdowns were design features. The Lincoln Tunnel scheme resulted in time savings of 10-25 minutes to some 35,000 daily commuters. Buses were provided with a special lane on the 4 Kilometre section of the Interstate 495 approach to the Tunnel during the morning peak period of each workday. The additional lane normally would have been one of 3 outward lanes with light usage during workday mornings. The change provided 4 inbound lanes for New York in the morning peak periods. Travel time savings were valued at $2.82 per person hour and annual benefits of the scheme amounted to $3.9 million (U.S.). The initial capital cost was $810,000 with annual running costs of $200,000. Capitalizing the project over 5 years with a discount rate of 6% resulted in a benefit-cost ratio of 11.2. The average flow of buses in the peak period (7.30 a.m. to 9.30 a.m.) was 818 buses (34,350 passengers). In the period 8 a.m. to 9 a.m., 480 buses carried 21,100 passengers. Daily lane volumes varied from 724 to 852. Bus users expressed favourable attitudes to improvements in reliability, travel times and comfort and safety. 81% of bus patrons interviewed indicated that they rode the same bus route previously. Only 4% of users had switched from private autos and some of these were from car pools.

Work carried out by the Greater London Council (GLC) provides possibly the best example of central-city planning for buses. It was found that the roads in London were carrying fewer people than they were 10 years previously (1973). Studies by the GLC showed that 25% of road space in Central London ought to be allocated to buses exclusively in a comprehensive system of bus lanes and bus only streets. The choice of potential bus priority sites based on subjective selection procedures offered limited benefits. Some 240 kilometres of higher-density bus routes were designated for detailed, systematic analysis, of this 80 kilometres were selected for project evaluation. In July 1973, a total of 57 bus lane schemes, including a bus-only regulation in Oxford Street, were approved and implementation commenced immediately.

The most significant beneficial effect claimed for bus lane projects is an overall reduction in trip times. Making the assumption that in-vehicle time is valued at the same rate for bus users and car users,[1] bus lane schemes ought to be considered where the reductions in travel times to bus users outweigh any increases for other traffic. This is only a "rule of thumb" and exceptions would have to be considered. It is quite possible that other traffic may experience reductions in travel time also. Buses may be the

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1 It has been suggested that bus users value their time more highly than car users. In any case, it strongly argued that a less than optimal use will be made of freeways with exclusive bus lanes unless a marginal cost pricing rule for road use is also adopted (Mantell, 1973).

cause of many delays and their separate operation may improve traffic flow. A second-order effect will result if the proposed change effects a diversion of some car users to buses. The reduced transit times incurred in buses may be sufficient to attract some increased patronage. The psychological effect of a clearly identifiable busway may also have some impact. Furthermore as recent research at the Commonwealth Bureau of Roads suggests, commuters value a service that has a minimum of stops. These factors may produce a significant modal diversion. Further benefits will be realized by bus operators as a result of any increases in average speeds. Speed tends to show up as a significant factor in bus operating costs. The reduction in the frequency, and number of stop-starts would be no less a significant factor.

BUS PRIORITY AND OTHER TRAFFIC MANAGEMENT MEASURES

The aim here is to obtain better use of an existing road network. Whether one adopts a philosophy of maximizing the flow of vehicles, or maximizing the flow of persons, much scope exists for obtaining significant benefits. Intersections are a source of major delays to all road traffic, and vehicle operating costs are sensitive to stop-start conditions. Improved signalling techniques at intersections are, not surprisingly, of major interest to traffic engineers. What is also becoming clear is that drivers can be dynamically routed to less congested roads if appropriate information is provided. Developments with the necessary equipment and drive attitudes toward the different information systems have been reported in the literature.

It is possible to make better use of a given road system by presenting information on congestion conditions to drivers. This is already a well-known practice. Commercial radio stations quite often advise motorists as a free community service, on the traffic conditions during peak periods. This contribution is a valuable one. However, it is possible to do more. Freeway systems can be used more effectively by extending this principle. Information on current traffic conditions can be transmitted by a number of means. A roadside radio system can broadcast messages. Visual signs can depict sympolic maps or changeable messages. In this way, motorists can be advised to divert to other less congested routes. Research into driver attitudes in the U.S.A. have revealed that diversions are made more in the expectation of avoiding a delay rather than for an actual time saving (Heathington, et. al., 1971).

Evans and Skiles found that delays due to traffic signals constitute some 10-20% of average bus trip times, excluding terminal delays, and 5-10% of the portal-to-portal trip time (Evans and Skiles, 1970). They argue that priority ought to be given to moving people, not vehicles, and that the technology exists and is easily implemented to offer bus priority at traffic signals. In an experiment carried out jointly by Wilbur Smith and Associates and the City of Los Angeles Department of Traffic, bus priority was accomplished by having a person manually actuate the traffic signal, so as to begin the given interval earlier if a bus approached the red interval. Alternatively, the green interval could be extended sufficiently long to get the bus through if it approached at the end of this interval, and might otherwise be caught at the beginning of the red interval. Electronic devices are available which allow the driver to obtain the same control over signals as the bus approaches the intersection. At the two intersections studies, bus delays were reduced by 70% and 76% respectively. Assuming that no reductions in delays accrued to cars travelling in the same direction as the buses, delays to other travellers increased by 51% and 24%. These percentages are expressed as per person changes and the total effect is a substantial net time savings. Of course if bus routes cross each other, the net effect may not be so encouraging. Not all intersections can be regarded as candidate sites as the total time savings may not be sufficiently large, or may even possible be negative.

One proposal has suggested a bus priority scheme that combines the traffic signal and bus lane approaches (Feather, et. al., 1973). The method could be used to control bottleneck intersections, too narrow to accommodate bus lanes. A queue detector is strategically placed at the bottleneck section which, when operated, short-cycles the preceding signals and traffic is metered into the bottleneck to control the queue length at the minimum necessary to maintain capacity. Buses are able to bypass queueing traffic earlier, where road width allows a bus lane to be accommodated, and can then proceed with minimum delay through the bottleneck. Capital costs would be low and total person delays at bottlenecks could be substantially reduced.

DEMAND RESPONSIVE BUSES

Dial-a-bus (DAB) is a demand responsive bus service using relatively small vehicles, most usually in low density population areas. It is a direct development of research carried out in the U.S.A. in the 1960's and has formed the basis of a number of experimental services funded by UMTA (Urban Mass Transportation Administration of the U.S.A. Department of Transport), the U.S. Transportation Development Agency, and the Ontario Ministry of Transportation and Communications in Canada. Some experimentation has also occurred in the U.K.

Transit utilization studies have established that for practical purposes the catchment area of a fixed route bus service extends to about 300 metres from bus stops. When superimposed on areas of low population density lacking sufficient through streets, fixed route bus systems are inaccessible to many suburban dwellers. The same is more than true for urban passenger rail and tram systems. In the outer suburban areas, these demographic conditions are most noticeable. Where local bus systems operate as feeder services to a line-haul transit system within these areas, the service level is poor and financially unsound, frequently incurring deficits. In yet other areas, no local collector and distributor services exists at all. Car-ownership and usage rates are high and a necessary aspect to living in this environment. The contribution to traffic congestion in commuting peak hours is high. Furthermore, housewives in one car families could be described as transport disadvantaged, particularly with reference to shopping trips.

Demand-responsive public transport has been advanced as a solution to these problems. Small buses can be used on flexible route patterns dynamically changed according to demands expressed via the telephone. Potential users can access the bus service by communicating demand to a central vehicle despatch unit. In this way door to door service can be provided. Small buses can provide the necessary manouverability for suburban streets with a unit suited to demand (seating capacity of the order 10-30 seats). It is hoped that many of the characteristics of the private car can be approximated in a public transit mode.

The service itself can be offered on a fixed route, fixed schedule basis or on a non-fixed basis. There are three major versions, many-to-one; many-to-few; and many-to-many. In the many-to-one service, the bus would collect its passengers from dispersed origins and deliver them to a single destination (which may be a terminal of another transit mode). The many-to-few operation is typically used to deliver passengers to a few locations, particularly shopping centres. The many-to-many operation links dispersed origins with dispersed destinations. The method of operation may be purely subscriptive, in which case the potential user books for a certain term (usually a week) on the service. The service here would be operated on a fixed schedule, fixed route basis which would be varied only between terms. The service may be dynamically routed. This may be worked by having a bus operated within a given zone but with a fixed schedule; or the bus may be operated on a dynamically determined schedule.

Dial-a-bus and its variants, are aimed at improving accessibility to line-haul facilities and at improving intra-area mobility. Volumes have been written on experimental projects, mainly in the U.S. and Canada, and in almost all cases qualified successes have been reported. When properly planned and put into operation in suited areas, patronage levels have been encouraging with favourable attitudes expressed by users. Where there existed poor service bus operations prior to dial-a-bus, subsidy requirements almost always declined. However, in all cases subsidies were still required, even though fares were high by Australian standards. The overhead burden of dispatching costs are typically great. Except in cases where very simplified subscription type services are operated on a small-scale basis, the facilities for dispatching vehicles must be quite sophisticated. The success of a demand-responsive service requires this. In most cases, access to computer facilities is required. Another cost feature is that of labour costs. As has been stated above, labour costs are the most significant operating cost in bus services. The nature of dial-a-bus service typically generates a vehicle productivity much less than 20 passengers per vehicle hour. It is not difficult to see why subsidies are required. The justification of dial-a-bus, therefore, depends upon the size of social benefits associated with the service. One source of these is the value that can be attached to the improved accessibility of certain transport disadvantaged groups most noticeably housewives, the aged, the handicapped, and the young. Further benefits can be gained if some diversion of work trips occurs, thus relieving congestion on the roads at peak-hours. Considerable planning effort is required for successful implementation of dial-a-bus schemes and careful analysis of the incidence of benefits is necessary. It is more than likely that the resulting income distribution effect would be regressive, given that the areas most suitable for implementation are typically high on socioeconomic ratings.

CONCLUSION

Clearly, transport planners have at their disposal quite a variety of investment options for improving on the passenger transportation infrastructure. The ones discussed in this paper are typical of those that have low gestation periods to implementation and involve relatively low capital outlays. There is a wealth of practical experience with them and it is possible to be relatively certain of their impacts. Significant benefits are possible by making better use of the existing infrastructure or by making small increments to it. What is required is a recognition by planners and authorities of the value of a more serious campaign to exploit to the full the opportunities afforded by these measures.

REFERENCES

Australian Department of Transport (1974). Study of the Effectiveness of Promoting Car Pooling Systems as a Means of Reducing Peak Hour Congestion. Final Report. Prepared by P-E Consulting Group (Australia) Pty. Ltd., Melbourne, May.

Evans, H.K., and Skiles, G.W. (1970). "Improving public transit through bus preemption of traffic signals", Traffic Quarterly, Vol. 24, No. 4, pp. 531-544.

Feather, D., Cracknell, J.A., and Forster, J.A., (1973). "Bus Priority in Greater London 3. Development of bus lane schemes", Traffic Engineering and Control, Vol. 14, No. 9.

Heathington, K.W., Worrall, R.D., and Hoff, G.C., (1971). "Attitudes and behaviour of drivers regarding route diversion", <u>Transport Journal of Australia</u>, Vol. 16, No. 9, pp. 10-23.

Mantell, E. (1973). "Rapid transit VS the car: How to make private decisions compatible with the social good", <u>High Speed Ground Transportation Journal</u>, Vol. 7, No. 1.

Pratsch, L. (1974). "Car pools - the underutilized resource", <u>American Society of Civil Engineers Civil Engineering</u>, Vol. 44, No. 1, pp. 49-52.

TABLE 1: PROPOSED 1973-74 INVESTMENT PROGRAMME

Project Type	Proposed Expenditure $m
Railway	
Additional Tracks	9.41
Electrification	6.41
Signalling	1.13
Rolling Stock	30.92
New Routes	30.20
Miscellaneous	0.52
Total Railway	78.59
Bus	
Busways	0.66
Rolling Stock	8.32
Miscellaneous	11.24
Total Bus	10.22
Tramway	
Route Upgrading	0.30
Rolling Stock	0.23
Total Tramway	0.53
Ferry	2.29
Passenger Interchange	5.78
Planning, Research and Development	1.58
Miscellaneous	0.25
Total	99.24

Source: A Review of Public Transport Investment Proposals For Australian Capital Cities, 1973-74, Bureau of Transport Economics, August 1973