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TITLE: Latent demand for transit: the case of Canberra's proposed LRT

ABSTRACT:
Canberra, the capital of Australia, is a city with two modes of mechanised passenger travel: traditional bus and automobile. While Canberra is the capital of the country, it is a relatively small city, with a current population of approximately 340,000 which is relatively spread out with a low overall average population density. Recently the local government (the government of the Australian Capital Territory) submitted a bid to the Australian federal government to fund a light rail system for the city.

This paper examines the issues surrounding serving low and medium density communities with structural transit alternatives such as light rail (LRT) and bus rapid transit (BRT), using Canberra as a case study. The study sets the scene by qualitatively and quantitatively characterising the socioeconomic and demographic profile of Canberra, focusing on centres of population and economic density; reviews the literature on LRT for low-to-medium density areas; examines the extent of 'latent demand' for transit in what is currently an auto-dominated travel environment; and concludes by analysing whether such latent demand justifies structural transit in Canberra and what such transit would look like if it is to be financially, operationally and environmentally sustainable.

SUBJECT/KEYWORDS: Urban transport; urban mass transit; LRT; BRT; latent transport demand

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Introduction

What is the critical mass of population size and density, economic activity and financial base beyond which 'structural' transit alternatives (i.e. bus rapid transit (BRT) and light-rail transit (LRT)) become viable for a given service area? Can structural transit attract and carry enough passengers per peak-hour, per direction, to justify its initial investment costs? Is it economically efficient? Is such transit the best option for realising 'latent' transit demand? These are key questions that small and medium-sized cities often must ask when considering investment in such alternatives.

Canberra, the capital city of Australia, is an example of a city that is currently considering building an LRT. Opponents of such plans argue that the city is too small in population, not densely populated enough, full of car-loving people and does not have the sorts of traffic congestion that would ever need transit beyond traditional buses. But proponents argue that there are viable service areas for an LRT, that there is untapped transit demand, and that population and development trends in the city will require structural transit investments. For this reason the Australian Capital Territory (ACT) government submitted in 2008 a bid to the Australian federal government to fund a light-rail system for the city.

This paper examines the issues of serving low and medium density communities with light rail, using Canberra as a case study. The study reviews the literature on latent transit demand and LRT for low-to-medium density areas; qualitatively and quantitatively characterises the socioeconomic and demographic profile of Canberra; and analyses what an LRT in Canberra could look like if it is to be financially, operationally and environmentally sustainable.

The prospect of LRT comes to Canberra

Thus far, Canberra has relied solely on traditional buses for passenger mass transit. The administration of these buses has moved into and back out of the structure of the ACT Government, currently being administered by an agency known as ACTION, but basically it is run as a municipal bus service.

Buses in Canberra attract relatively little patronage. In 2001, cars carried 83 per cent of work trips, with public transport carrying 7 per cent, walking 4 per cent and cycling 2 per cent. Compared to Australian averages Canberrans drove and cycled more, walked about the same and used public transport less. It should be noted, though, that the overall Australian usage of transit is not especially high, around 10 per cent [ABS 2008].

With the national election that swept in a Labor Party government in November 2007, the new Prime Minister Kevin Rudd announced that he was creating a body called Infrastructure Australia (IA) that would fund new investments of 'strategic' significance. About a year later, ACT Chief Minister John Stanhope announced that his government was going to submit a proposal to IA for an LRT in Canberra.

The initial proposal consisted of a press release costing an LRT at $A1 billion. The proposal then made its way through official processes. IA asked that the ACT government prepare a 'business case' and the government contracted with Price Waterhouse Coopers (PWC) to prepare and submit this case which, after a delay, was made public on the internet [ACT 2008]. In December of 2008, IA announced that a Canberra LRT was on its 'longlist', and revealed a single line-item costing it at $A2.95 billion. The project has remained there ever since.

IA has not yet made a decision on this proposal but the long delay in a final decision does not bode well for federal funding. However the process has been useful in bringing two questions to the fore: (1) is there ‘latent demand’ for transit that exists but which the current bus-based system does not serve? And (2), if so, is LRT the most efficient way to realise and meet that demand?

<u>Latent transportation demand: an introduction</u>

Latent demand in general refers to consumption that would occur if conditions were amenable but remains unrealised until conditions that underlie demand change. An example would be neighborhood residents who would buy cappuccino in an upscale cafe but do not do so because such a cafe does not exist. Once the cafe opens, this latent demand would be realised.

The analogy in transport is a traveler who would travel if the means for travel were available. If there is no change in transport infrastructure this demand remains latent. But if a roadway is opened, or adds capacity, new travel may occur over and above what existed before and this latent demand can now be realized or, to use the more technical parlance, induced. In this case one could thus loosely speak of the increment in travel as representing the latent demand for road travel that the new roadway capacity released [Fulton et. al. 2000].

The process is one of basic economics. Consider supply and demand for some transport service, as in Figure 1 (in this case, some sort of transit). Assuming a perfectly competitive market with proper pricing (i.e. the marginal cost of travel is fully captured by prices, including appropriate fares) there will be equilibrium where the supply of transport equals demand.

There is, however, demand for transport that exists but which remains unrealised (latent) because of various constraints. Figure 1 depicts a supply constraint in which there is significant latent demand unserved by existing transit supply in the ‘base case’ (i.e. the existing situation before an incremental investment). If the supply of transport were greater, this demand would then become induced demand, i.e. realized demand that is generated (or induced or “drawn out”) because of improvements to the transportation system. Until that supply is added, such demand will remain unrealised. Figure 1 depicts a partial realisation of this latent demand by a shift in the supply curve.

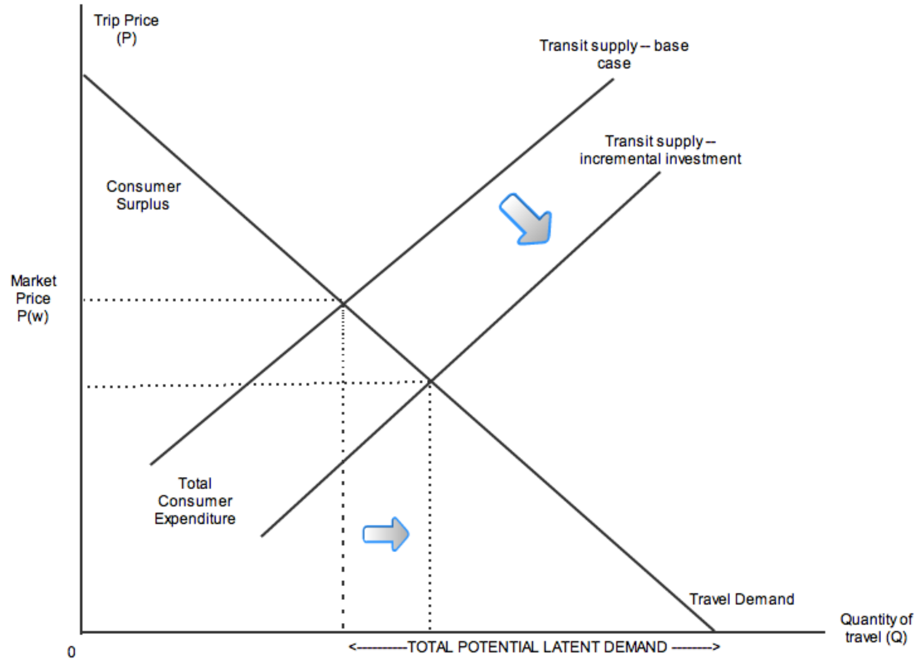

Figure 1: Latent Transportation Demand Analysis

Of course planners need to forecast latent demand with more specificity. In this simple example, demand is a straight line. Imagine that the line describes the demand for transit and the equation for this line is V = 2500 – 350t, where V indicates transit demand and t indicates travel time. If current average travel time given the existing transit system was 5 minutes, then current transit demand (V) is 750 daily trips. The theoretical maximum number of trips that could be taken with shorter transit times is 2500 (if t = 0). The maximum latent demand would be the difference between this maximum demand and the current demand or 2500 – 750 = 1750 [Kumares and Labi 2007, pp.56-57].

This is, of course, a very simplistic example for many reasons. There will always be some latent demand given absolute physical constraints on travel time and costs of providing transportation. And from an economic perspective, it is not always optimal to serve latent demand if the benefits of serving that demand are outweighed by the costs. Economic efficiency is a key criterion in transit provision and any sound investment analysis must contain a proper comparison between the base case and a variety of well-specified alternatives. Figure 1 only shows that an incremental investment in transit could serve potential latent demand. It does not show whether it is cost-beneficial to serve that demand or, if it is cost-beneficial, what form that transit investment should take (e.g. BRT, LRT or bus).

In deciding whether to provide transportation services, there are thus many questions to consider. Travel demand generally, and transit demand more particularly, is a function of multiple factors, including relative value of time to different types of users. But clearly a key basic question is to estimate whether there is any potential demand that a new system investment would draw out. If it is determined that there is such demand, the next question turns on how best to serve that demand in an economically efficient manner, as well as in a way that meets other social and environmental objectives. This paper will focus on the basic demand question in an economic efficiency context, but these other questions should not be lost sight of.

Tipping points for LRT: what the literature says

What is LRT? One author cites the Transportation Research Board (TRB) definition: “Light Rail Transit: A metropolitan electric railway system characterised by its ability to operate single cars or short trains along exclusive rights-of-way at ground level, on aerial structures, in subways, or occasionally, in streets, and to board and discharge passengers at track or car floor level.” He adds more informally that, “If a line or system is in fact a version of something that could legitimately be identified as streetcar, trolley, or interurban, then it is LRT.” [Boorse 2007, 443]

When it is viable to construct and operate an LRT? There are three basic dimensions to consider in answering this question: cost (capital and operating), density and operating environment.

>>> ***Cost: capital***. LRT represents a substantial capital investment for any area considering building one. A meta-review of literature on capital costs of LRT by Zhang (2009), focussing on North American systems, estimated that the average capital cost per route mile was $26.4 million (all figures in 1990 US dollars). The range for this capital cost was substantial however, from $9.4 million to $90.19 million across LRT systems. These average capital costs were more than twice as high as those for bus rapid transit (BRT) but lower than those for traditional heavy-rail metro systems.

>>>***Cost: operating.*** Once built, the general rule-of-thumb is that LRT has lower operating costs because it offers higher passenger capacity per unit labour cost. However the literature does not seem to find this as given. Zhang notes that per revenue-mile, LRT actually has higher operating costs as compared to BRT. Other measures, such as cost per rider and cost per mile often reverse this relationship. The key might be revenue collected per mile: LRT costs more to build than BRT and obviously much more than regular bus service so if it fails to attract enough riders, or if fares are set too low, this would push up the revenue-mile operating costs. Vigrass and Smith (2005) note that in the United Kingdom, where LRT projects must demonstrate in advance that they recover operating and maintenance costs, such unit operating costs are lower than in France where there are no such requirements. It must also again be pointed out that there is a wide range of individual system costs, with some specific LRTs having lower operating and capital costs than some specific BRTs.

>>>***Density***. In general the threshold for a viable LRT is seen to be around 2223 people per square kilometre assuming 4 people per dwelling. This is as compared to a 988 people per square kilometre threshold for traditional bus service [Zhang 2009, and author calculations].

This metric does not consider economic activity patterns that generate trips; as an extreme example, a very dense population where all leisure and work takes place at home would not generate sufficient trips to support an LRT. Also, as discussed further below, these are population density figures, whereas the key variable may be ridership density. Still, given 'average' activity patterns, these basic rules-of-thumb suggest the numbers needed to support a given transit mode, with LRT being on the higher end of the scale in terms of minimum density.

>>>***Operating environment.*** This is a catch-all term that includes factors such as fiscal capacity, governance institutions, socioeconomy, physical geography/topography and individual attitudes towards modes. If cost and density can be considered to be necessary conditions for LRT adoption, these other factors can be seen as the sufficient conditions that tip a community into or out of such adoption. For example many dense cities in developing countries do not have the fiscal capacity to build an LRT even though the fundamental economics might support adoption of such a mode. Similarly there are physically rugged island communities (e.g. Hawaii) that have dense population pockets separated by impassable ranges. Communities of similar densities with different operating environments might well be able to build a viable system. Finally, there is the elusive element of user preferences. For example, transit is more likely to be fully utilised by a population with strong 'green' values than one without.

It should be noted that these are not the only factors transit planners should consider in transit planning. There are, of course, many externalities to be included in any calculus, such a greenhouse gas emissions and pollution, which may make a transit investment viable even if the factors described above do not argue in favour of it. There is also a social justice and inclusion element to consider and there may be compelling reasons to offer a particular transit service on these grounds even if 'efficiency' criteria are not met. Relative safety of different modes is another important element to be factored in. And other public policies, such as land-use and parking regimes, must not be ignored.

So the analysis offered here is a basic one. Nonetheless it is an essential foundation for transit decision-making. Keeping this in mind, each of these dimensions of cost, density and operating environment will now be considered with respect to the case study of Canberra, Australia.

<u>Canberra's spatial and demographic density</u>

The overall area of the ACT amounts to 2,358 square kilometres. In 2006 the Australian Bureau of Statistics (ABS) estimated the population of the ACT to be 333,940. If one looks at overall average population density, Canberra's density of 142.1 people per square km (as of June 2006) is well below what the literature says is the minimum threshold for rail transit.

However what matters for LRT is not population density but ridership density, i.e. whether potential ridership is dense enough in the areas potentially served by transit. Moreover, past density is not as important as future growth and distribution of that growth in terms of serving latent demand.

Might Canberra have sufficient present and potential ridership density for LRT? One way to answer this question is to benchmark against other places that currently have an LRT. Comparisons with other Australian localities would be the first choice of benchmark but Australian settlements follow a basically bimodal distribution: large cities and their suburbs or 'country towns.' Because of its planned nature, Canberra's size is unique in Australia.

An alternative could be a comparison with the US. The US, like Australia, covers a very large geographic area and has many communities of a similar size. Moreover some of these communities are relatively isolated, not part of an overall dense network as is the case in much of Europe. Thus, for rough comparative purposes, the US is used as a benchmark here.

US cities with LRTs for total urban populations equal to or less than that of Canberra include Trenton, New Jersey and Tacoma, Washington. One of these, Trenton, is the state capital of New Jersey, a symbolic parallel to Canberra and the ACT. It is perhaps of some importance to note that most other country capitals around the world have rail transit, though of course most of these cities are far bigger than Canberra (though Washington, DC's population is not especially large in gross terms at 588,292 as of 2007). [APTA 2008].

With regards to ridership density in potential LRT service areas, the story in Canberra becomes more interesting, for population densities and growth in population vary widely across the 'suburbs' (i.e. neighbourhoods) that make up the city . Many of these suburbs have densities similar to US cities that currently have light rail. As such there might well be corridors that could sustain peak-hour passenger loadings that could justify the capital cost of an LRT.

According to ABS estimates for 2006, a majority of Canberra suburbs have population densities greater than 1,000 people per square kilometre (the actual count is 58). More than a few, such as Braddon, Turner, Page, Scullin, and Banks, have densities greater than 2,000, sometimes well above 2,000. (Kingston is just short with 1975.3). Palmerston has the highest population density in the ACT at 3038.3 [ABS 2008].

Densities such as these are comparable to the densities of US cities that have light rail including some big ones. There are 30 urban light rail systems in the US and seven of them have population densities between 1000 and 1600, putting them well within the range of the majority of Canberra suburbs. These include cities such as Houston, Dallas, San Diego and Denver. The large and growing system in Salt Lake City actually covers an urban area with a population density of just 643.3. And Canberra does have significant pockets of density that approach densities in older and tighter cities such as Cleveland, Pittsburgh, San Jose, CA, St. Louis, Minneapolis and Seattle. [APTA 2008]

It is also interesting to see where population growth is occurring in the ACT. From 1996-2006, there have been clear growth pockets well above the average for the ACT and Australia as a whole in three major areas – The Civic core; Gungahlin and surrounding suburbs to the north of Civic; and Kingston-Manuka which is to the south. There is also some well above average growth in pockets of the Woden Valley. These happen to be areas where the ACT government is funnelling a lot of the development and all of these areas currently have high population densities, certain to increase with time. There are also quite a few dense suburbs adjacent to these growth pockets that have very high densities (e.g. Hackett with 1526.9).

Even more important from an LRT perspective is that these suburbs represent (mostly) economic centres of activity that could serve as transit stops and that these suburbs generally run along a north-south axis with the downtown (Civic) at its centre. The ACT IA submission contains a notional LRT network map which is reproduced in Figure 2. The route running from “Gunghalin” in the north through Civic (the red dot just below “Canberra”) and down to “Woden” is a route that passes through or near most of the population centres noted above and are generally the consensus for where initial structural transit alternatives should be placed. North of Civic they also happen to be along or near Northbourne Avenue, which is where Griffin placed rights-of-way for his tram system.

So in a broad sense the ACT does seem to have enough ridership density, either currently or potentially, and has it in adjacency patterns that might support a LRT. One important note, however, is that many of the current densities are below the minimum notional population density thresholds for LRT though this applies in some of the US cities discussed as well.

Potential operating and capital costs of a Canberra LRT

The ACT IA submission follows very closely a 2004 Kellogg Brown and Root study, commissioned by the ACT Land and Planning Authority (ACTPLA) to examine future transit options [Kellogg Brown & Root 2004]. That report provided a rough costing out of a system of 54.4 kilometres in total with segments mostly similar to the IA submission. That system provided for 108 stations (56 stops) roughly 1 km apart, running along the centre-line. Stations were of a standard design with extended curbs to form low platforms, and equipped with shelter overhangs, ticketing machines, electronic information boards and other basic passenger facilities. The major structures to be built were three bridges, two rail undercrossings, two ramps, and one underpass, along with a variety of other minor edifices. Approximately ten power substations were also required. Vehicle types were assumed to be ALSTOM Citadis low floor trams with a 40 passenger seatings and a crush load of 197; their assumed cost (as of June 2003) was $A3 million each and the fully implemented system was to have 106 of them and 4 additional spares [Kellogg Brown & Root chapter 11]. A completely built out system was estimated to cost approximately $A1.3 billion. When discounted over 20 years, using a 5% discount rate, construction costs amounted to $A575 million, $A190 million in vehicle costs, and $A161 million in operating costs [Kellogg Brown & Root chapter 12].

The IA submission appears to closely follow these details, citing the Kellogg report, and updating them for inflation using the Australian Consumer Price Index (CPI) to the base year of 2008. Some broad tweaks are made to the proposed network but it essentially matches the one in the Kellogg report. All land required for right-of-way (ROW) was assumed to be in government ownership. The ticketing system was estimated to cost $A10 million. Similar to the Kellogg report, a 4 year construction period was assumed, with the first section completed within two years and operations commencing immediately after construction is complete. The inflation adjustment led to capital costs of approximately $A2 billion and operating costs of approximately $A1.2 billion (both undiscounted) over the project life period of 30 years.

Of course prospective costings are always speculative to some extent. Are these estimates reasonable given the experience of other systems? To be conservative, if one were to use Zhang's high end estimate for LRT, adjusting for metric, and converting into Australian inflation-adjusted dollars, that would entail a capital cost of $A2.75 billion (at exchange rates of 0.66 $A per $US, a low trading range and reflating to 2008 dollars). This figure is well above the initial request that the ACT government submitted to IA. Using Zhang’s lower end unit cost estimate similarly adjusted would yield a total cost of $A808 million in current dollars, an estimate well below the official proposal cost. What this broad comparison suggests is that the estimated capital cost is not out of a feasible range.

Even if this capital amount is fully funded by the Australian Commonwealth Government, the system would need to be operated and this could be a significant ongoing cost. The IA submission estimates a $A1.2 billion operating cost over 30 years (undiscounted), which is an average of $A40 million per annum. Of course this operating figure would fluctuate as ridership ramped up. The IA submission posits an aggressive 50% increase in public transport share of total work trips over the 30 year project period, from 9% in 2011, to 16% in 2028 [ACT 2008, 15].

The Buffalo system, a 6.6 mile system serving roughly 20,000 people daily might be a rough cost comparison (though it is not noted for being efficient). Zhang notes that the 1992 operating on-street costs were (adjusting as before for exchange rates and converting to 2008 dollars) approximately $A154 million. Another point of comparison is the more successful Sacramento LRT which, in 2005, incurred total operating expenses of $A59.5 million [Schumann 2005 and author calculations]. In this case the annual operating cost estimates for Canberra LRT appear to be a bit on the low side.

These operating expenses are not insubstantial amounts, obviously. The total expenditure of the ACT government in 2007-08 was $A3.1 billion [ACT 2008a]. The total budget for ACTION, the bus system, was $A96.5 million, with an ACT government contribution of $A59.7 million. Total boardings for the system were 16 million (in 06/07), and farebox recovery amounted to 19.5% [ACT 2008b]. Thus if an ACT LRT behaved like the Buffalo system in terms of cost and ridership, its operating costs would swamp current bus expenditures and deliver half as many riders (approximately 7.3 million, assuming 20,000 riders 365 days per year). The situation is better if the Sacramento baseline is used but still short of the IA estimates.

<u>The LRT operating environment</u>

Canberra is relatively unique for a potential LRT site in being completely (if often imperfectly) planned. The fact that it has population centres located in patterns that could potentially support an LRT corridor or other structural transit spine has arisen in no small part because of that planning. This past planning has created current conditions that can support structural transit and future planning could make the difference between a good viable structural alternative and bus-served sprawl. (As an aside, this is a general lesson for other, similar, communities even if there is not a tradition of master design templates. Indeed many of the places in the US discussed here were not planned in any central way and yet managed to build LRT which relied, in part, on development policies to help grow and sustain it. This is an oft-made point but one worth repeating).

Physically, Canberra offers a relatively amenable environment for building and operation of structural transit as well. There is no especially significant grade to overcome, no particular need for tunnelling, and in some potential corridors, transit rights-of-way (ROW) are implicitly available (as is the case along Northbourne Avenue). The Kellogg Brown and Root report does indicate a need for new bridge structures. No LRT or BRT is cheap, and one in Canberra would not be an exception, but the physical conditions that such a project would have to contend with would not be extra-ordinarily costly.

Regarding the attitudes and preferences of the user base and the extent of latent demand across that user base, Canberra is promising in being high-income and, at the margin, socially and politically 'progressive.' The 2008 local election saw a run of preferences towards the Green party which resulted in a minority Labor Government. The overall current and projected size, density and layout of Canberra does not suggest that the city will ever have a dominant share of travellers on transit, but one does not need such dominance to support a viable structural transit corridor. The analysis here is obviously ad hoc. Interestingly, there has been little research done on the attitudes and preferences of potential users, which seems an important planning omission.

<u>What is the 'bottom line' on Canberra LRT</u>?

Canberra demonstrates that LRT is not necessarily just suited for a big, dense urban area. The oft-cited metric of population density is not equivalent to ridership density. It is possible to have sufficient densities situated closely enough to one another to justify an LRT even if overall population density is low. The broad analysis offered here shows that the viability of LRT cannot be dismissed easily in the case of Canberra. In general detailed service areas need to be conducted before taking the next step of putting forward specific transit alternative plans.

There is some evidence, much of it already discussed here, that well-planned and executed structural transit systems can take root, and attract patronage, given enough time even if there is not a prior history of high transit usage. Certainly some structural transit, perhaps BRT, does seem to be suggested for the ACT. More than a few successful LRTs and BRTs have started small and expensive and grown to be viable and accepted and efficient carriers of people.

But structural transit is expensive, and one should not assume that the ultimate benefits will outweigh the costs. The fact is that a combination of factors drive the viability of structural transit suggests that planning must be especially varied. Well-planned and well-designed systems can work and have worked in places that seemed unsuited to it at first glance but did work in part because planning, both advance and ongoing, was well thought out and planners recognised that the build-up in ridership took years, not months to accomplish. As ane example, Sacramento in particular has seen heavy growth in system usage and its bus ridership in 1987 was similar to current ridership in Canberra in a similarly low-density context, before its LRT was built. Salt Lake City, Utah is perhaps even more relevant to the Canberra case in that, like Canberra, it sits in a broad area and has expanded laterally and with relatively low density. Yet its TRAX LRT system has exhibited strong ridership growth and continues to expand [Thompson and Brown 2009].

These cities, and others of lower density, have succeeded because the systems designed have been generally responsive to rider characteristics and needs and provide networks that both build off of existing ridership densities while responding, at least for a while, to areas of new growth. Of course the reverse lesson applies – even when factors seem favourable to LRT, poor design and management can make it a failure.

Both of the examples just discussed provide, however, a key cautionary tale as well: buses matter. Sacramento started strong but its transit system has faltered in the past 10 years or so, with relative LRT ridership falling off (though absolute patronage has grown). Salt Lake City's LRT ridership has remained strong but the performance of its overall transit system is mixed.

The big issue in both places is neglect of the old-fashioned buses that existed before LRT. A key temptation is to cut back the buses to focus on the new structural alternative and the capital and ongoing costs of such alternatives often might seem to require such resource shifts. But structural alternatives tend to require good bus service as both feeders to and from corridor routes and to increase the density of the network along and close to corridors. Canberra's current plan in fact budgets for cost savings of $A348 million, undiscounted, from fleet reductions in its ACTION service over the project life [ACT 2008, Chapter 10, author calculations reflating a $90 million discounted figure at 7% discount rate]. Experience elsewhere suggests that such reductions should be looked at carefully and not just assumed or done out of pure fiscal exigency.

In fact, Canberra's current development patterns do argue for some significant bus feeder service into the likely LRT (or BRT) spine presented in Figure 2. A loop service feeding from that spine into Belconnen is an obvious and necessary element, and some kind of frequent loop service through Hackett, Watson, Lyneham and O'Connor would make some sense as well feeding into the Civic area. On the south side, feeder service into and out of the suburbs of Deakin and Weston and into Woden might make sense. All of these suburbs have significant population density and economic activity patterns that a good feeder bus service would plausibly bring into the effective service area of structural transit. Scrimp on the buses here, and perhaps elsewhere, and the effective reach of structural transit will be correspondingly limited.

Overall, the current Canberra LRT proposal does have the basic design elements in place and has suggested seemingly sensible corridors as far as ridership densities. The capital cost estimate seems to be reasonable, as compared to experience elsewhere. But some elements raise questions. The assumption of significant downscaling in bus service might end up being counterproductive. Integration of LRT with buses and with other policies, such as land-use, must be continually change-managed and are not explicitly addressed. Although federal funding might ease or eliminate the capital cost burden, operating costs will remain as a significant demand on local taxpayers and these appear to be potentially understated. The alternative of a BRT is not fully considered. And perhaps most importantly LRT in Canberra will be a long-term investment with long-term payoffs, where short-term costs will likely not be met with immediate gains.

Nonetheless a well-designed structural transit system in Canberra could prove to be a worthwhile investment in the basic terms of meeting latent transit demand. The conditions there seem to indicate that there is at least some latent demand for good transit that, with proper land-use and operational planning, could be in the form of viable structural transit. The addition of other considerations, such as carbon footprint, would likely only strengthen the case.

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