Glenorchy to Hobart CBD Transit Corridor

High level review of corridor options

November 2011

Department of Infrastructure,
Energy and Resources

Tasmania
Explore the possibilities

CONTENTS

1 EXECUTIVE SUMMARY

- The *Tasmanian Urban Passenger Transport Framework* describes the strategic direction for delivering better modal choice to people in urban areas. The Framework identified transit corridors as one of the key measures to improve public transport use.
- The Framework focuses on building demand in the short to medium term through modal shift and land use change by improving the existing bus-based system. These actions are considered essential to providing a strong future justification for the very large capital investment required for a mass transit system.
- The vision underpinning the transit corridor concept is to consolidate population density and activity around designated high frequency transit corridors which connect to the Hobart CBD. These corridors will need to be supported by high quality infrastructure to enhance the attractiveness and reliability of public transport.
- The *Hobart Passenger Transport Case Study* identified Main Road as one of the major transit corridors in Greater Hobart based on its function, population catchment and existing service frequency.
- The purpose of this paper is to undertake a high level review of the three potential transit corridor options in the Northern Suburbs to confirm whether Main Road should be the focus of the transit corridor investigation. The three corridors are the Brooker Highway, the rail corridor and Main Road. The Main Road corridor consists of Main Road, New Town Road and Elizabeth Street.
- The wider passenger transport potential of both the Brooker Highway and the rail corridor have previously been analysed in some detail. This review takes into consideration this previous work.
- The Brooker Highway is Hobart's key intra-urban highway, with a vital freight and car based passenger function. Its role and the longer term planning for the Highway is outlined in the *Brooker Highway Plan*. The plan does not support increased land use density and activity around the corridor, which are considered essential elements of the transit corridor concept.
- Previous modelling of bus priority measures on the Highway also indicated that future travel time savings for buses could only be achieve by measures that would also create significant travel time delays for car based commuters. Such measures appear inconsistent with the role of the highway as a key intra-urban link.
- The rail corridor offers a number of clear advantages over both the Brooker Highway and Main Road. In particular it offers a congestion free thoroughfare that can be reserved for public transport.
- The rail corridor has been the subject of much public discussion and separate investigations by DIER and Metro Tasmania into the development of light rail and bus rapid transit on the corridor.
- The primary limitation of the rail corridor is the likely level of investment required to develop a public transport service along the corridor and the high level of demand required to ensure the benefits exceed the costs.
- The rail corridor is located adjacent to the activity centres of Glenorchy and Moonah and within walking distance of the New Town shopping centre at Risdon Road. However south of New Town, the rail corridor is separated from key attractors and residential areas.

- The rail corridor is to be the subject of a separate paper to be developed by DIER for consideration at a national level. This work will reflect the findings of the recent *Light Rail Business Case* and the long-term strategy described in the *Tasmanian Urban Passenger Transport Framework* for the development of a mass transit system in Hobart's Northern Suburbs.
- Development of the rail corridor would still leave two critical elements of people movement in Hobart's Northern Suburbs unaddressed. These are how best to move people by public transport from points between the Hobart CBD and New Town and how to move people to key attractors in between widely-spaced rail stations at Glenorchy, Derwent Park and Moonah. In both cases the Main Road corridor remains the key corridor.
- In spite of Main Road's recognised importance in the current public transport system and the likely need to continue to deliver services on this corridor regardless of future development on part or all of the rail corridor, the Main Road is the only Northern Suburbs corridor that has not been investigated in detail from a transit corridor perspective.
- Of all the three corridors, the Main Road has the highest population currently living within walking distance of the corridor (800 metres) and the number of trip attractors on the corridor far exceeds those on the other two corridors.
- The Main Road corridor carries 85 percent of public transport passengers in the Northern Suburbs, compared to the Brooker Highway which only carries 15 percent of public transport passengers.
- The Main Road does have a number of limitations as a public transport thoroughfare in terms of competition for road space from other modes, such as cars and pedestrians. However, as these competing demands are likely to continue into the future, a better understanding of them is essential.
- For these reasons, the Main Road corridor is the most obvious candidate for further investigation as a transit corridor.
- It should be noted that funding is available to develop a second transit corridor plan in Greater Hobart.

2 SCOPE OF HIGH LEVEL CORRIDOR REVIEW

The intent of this paper is to undertake a high level review of the three potential corridor options linking the Northern Suburbs to Hobart CBD, in order to confirm whether Main Road should be the focus of the first transit corridor investigation.

The three corridors within the study area are:

- Brooker Highway.
- Rail corridor - for light rail or bus rapid transit.
- Main Road, including New Town Road and Elizabeth Street.

Using the Derwent River as a transit corridor has not been considered in this review. As part of the *Hobart Passenger Transport Case Study*, the feasibility of running passenger ferries on the Derwent River was investigated. The results of the study questioned the viability of a service given the limited role it could play in the overall passenger transport task.

Two potential sites for a ferry 'port of call' were investigated in the Northern Suburbs, where it was believed that there could be interest in operating a passenger ferry service; these were Prince of Wales Bay and New Town Bay. Both these sites were excluded from more detailed investigation as they did not offer a competitive advantage over existing modes of public transport.

This high level review is based on previous work that has been undertaken by DIER in terms of the Brooker Highway, together with both light rail and bus rapid transit on the rail corridor. It is not the intention of the Transit Corridors project to conduct a substantial review of these corridor options or repeat previous work.

3 PROJECT BACKGROUND

The *Tasmanian Urban Passenger Transport Framework* describes the strategic direction for delivering better modal choice to people in urban areas. The Framework identified transit corridors as one of the key measures to improve public transport use.

The presumption underpinning the Framework, is that consolidation of population density and activity is desirable around designated high frequency transit corridors which connect to the Hobart CBD. These corridors will need to be supported by high quality infrastructure to enhance the attractiveness and reliability of public transport. Land use change is also required to increase population density and activity around the corridors.

The *Hobart Passenger Transport Case Study* identified two major transit corridors in Greater Hobart based on function, population catchment and existing service frequency:

- Sandy Bay to Claremont, passing through Sandy Bay, Hobart CBD and Glenorchy using Sandy Bay Road, New Town Road and Main Road.
- South Hobart to Howrah, passing through the Hobart CBD, Rosny and Bellerive using Macquarie Street, Tasman Highway, Rosny Hill Road, Cambridge Street and Clarence Street.

It is proposed that these corridors will be the focus for investment in public transport, walking and cycling infrastructure and for policies and strategies aimed at land use change.

Transit corridors are intended to target the wider passenger transport task, focusing on making public transport an attractive option throughout the day rather than specifically focusing on managing commuter demand in peak travel periods.

The weekday peak is only a proportion of the overall passenger transport task in Tasmania. If a meaningful change to travel behaviour is to be achieved, public transport must be able to

offer a viable alternative for a broad range of trips throughout the day. Results from the *Greater Hobart Household Travel Survey* show that during the week; one third of trips are for work (32 percent), while shopping (22 percent) and recreation and entertainment (19 percent) are also important trips. Therefore it is important to consider and plan for this diversity of trip needs.

The overarching objective of transit corridors is to provide high quality public transport corridors and services in urban areas to encourage and support modal change through guiding future Government investment along transit corridors and creating more supportive land use patterns.

Transit corridors are intended to be the focal point for communities to develop around from a land use perspective both in terms of population and employment activity, rather than simply being a means of providing the fastest trip between two points.

The Framework emphasises the importance of increasing the demand for public transport as a proportion of total trip making. The Framework deliberately emphasises improving the existing public transport system, together with improving walking and cycling networks over the short to medium term.

The first priority is to reconsider the public transport product currently on offer, and ensure that the basic expectations on service frequency, accessible infrastructure, price, convenience and reliability are met.

The *Tasmanian Urban Passenger Framework* provides the policy and planning context for how passenger services should be developed over the long term to better meet metropolitan passenger needs. Over the long term, the Framework identifies light rail and bus rapid transit as desirable options, but only if demand for public transport exceeds, or is expected to exceed, the capacity of existing infrastructure and land use changes are likely to lead to greater densification of population around major corridors. As a first step, the Framework recommends improving the frequency and reliability of public transport to increase demand on existing corridors. This is seen as the logical starting point to achieve a meaningful improvement in the mode share of public transport.

4 HIGH LEVEL REVIEW OF CORRIDOR OPTIONS

4.1 Brooker Highway

DIER has previously investigated bus priority measures on the Brooker Highway, in order to gain an understanding of what travel time savings could be achieved by buses and the impact this would have on travel times for car commuters and freight.

Function: The Brooker Highway is Greater Hobart's key urban passenger and freight route linking southern distribution centres to the Northern Ports. Its primary role is to carry freight and car-based passenger traffic, rather than provide a key public transport route. When comparing the number of public transport passengers travelling through the Northern Suburbs on either the Main Road corridor or the Brooker Highway, the Highway only carries 15 percent of public transport passengers, while Main Road carries the remaining 85 percent.

The Brooker Highway is a Category One road under the *Tasmanian Road Hierarchy* and is part of the National Network. The Brooker Highway carries a high freight tonnage, of 2.7 million tonnes per annum (2008/09) and high car passenger volumes, of 50,000 vehicles per day on the busiest section (between the Domain Highway and Derwent Park).

Congestion: Analysis of Hobart's five main arterial corridors shows that passengers along the Brooker Highway experience the longest delays and the slowest travel speeds, especially during the inward morning peak. The *Brooker Highway Transport Plan* identifies that there are capacity issues on the southern section of the highway from Berriedale Road to Davey Street and at some key intersections. These delays also reduce bus reliability.

Public transport priority and previous studies: Bus priority has previously been investigated on the Brooker Highway from Elwick Road to Risdon Road by DIER and GHD in 2009. The investigation included modelling of:

- Bus priority at signals.
- Bus pre-emption at signals.
- Dedicated bus lane with pre-emption at signals.

However, the results of the modelling indicated that where bus priority measures resulted in a decrease in travel time for buses, this caused a significant increase in travel time and delays for all other road users. Measures that increase travel time for other users are problematic given that the Highway is a major freight and car commuting route.

It was recommended not to implement any of the options investigated. Even the most effective option (in terms of time savings compared to cost) delivered only modest outcomes. This option was a six second bus priority start at signals, together with a dedicated short bus lane on the 'third lane' at key intersections. The modelling showed that the option would result in a small travel time reduction for buses of between 10 seconds and 2.5 minutes, depending on the direction of travel, and increase in travel time for cars of up to 10 minutes between the Foreshore Road at Montrose and Burnett Street.

The cost of implementing these measures was estimated at $10-30 million. This cost was based on extending the third lane on the approach to key intersections to ensure buses were not delayed by queued traffic and therefore were able to gain the benefit of the signal priority. The modelling also assumed buses would continue to pick up passengers on the Highway, negating some of the travel time savings.

Integration of land use planning: Typically, transit corridors run along main streets as opposed to highways, as main streets are the location where a greater number of people live, work or conduct their day to day activities. Examples of these corridors include Sandy Bay Road and Invermay Road in Launceston. Highways are generally not considered appropriate locations for such corridors since they do not allow for the integration of adjacent land uses and public transport. The *Brooker Highway Plan* states that the function of the highway needs to be protected through appropriate land use planning. Transit corridors require increased residential development and mixed use to create demand within the corridor to support public transport.

Increasing residential density along the Brooker Highway is likely to result in land use conflict through amenity impacts, such as noise due to high traffic volumes, particularly heavy vehicles. The likelihood of further residential development along the Highway is therefore undesirable. Similarly, commercial development along the Brooker Highway needs to be carefully located to ensure that no new access points are created and that access is via local access points, which have adequate capacity to cater for an increase in volumes. The strategic goal for the Brooker Highway is to reduce and consolidate access points where possible.

The Brooker Highway also does not exhibit the number of trip attractors found along the Main Road and rail corridor, in particular activity centres such as Glenorchy, Moonah and North Hobart, together with schools.

Public transport frequency: Although buses do use the Brooker Highway, these are generally peak express services to the Hobart CBD. Main Road has a much higher public transport frequency than the Brooker Highway, especially outside the morning and afternoon peaks. On Main Road, a total of 170 services are provided in a 24 hour period on weekdays, 32 of which are in the peak periods. By comparison, 82 services operate on the Brooker Highway, 30 of which are provided in the peak.

Express services currently operate on the Brooker Highway because faster travel times can be achieved for passengers travelling into the Hobart CBD than on Main Road. The X4 which travels from the Glenorchy interchange via Elwick Road and the Brooker Highway has an average travel time of 19 minutes during the peak to the Hobart CBD; the X1A, which is the Main Road express via Argyle Street, takes 24 minutes to travel to the CBD.

If equivalent or faster travel times could be achieved on alternative routes such as Main Road or the rail corridor, it would be expected that the number of buses using the Brooker Highway will significantly reduce because of the limited number of trip attractors on the route.

Targeting wider 'people movement' task: The intent of the transit corridors concept is to meet the broad passenger transport task, rather than specifically focussing on car-based commuters during peak hours. In terms of people movement, the primary function of the Brooker Highway is for car-based commuting, rather than a public transport route. While encouraging commuters to shift to other transport modes, such as buses is important, it is not the only policy objective. Further, at present there are substantial impediments to reducing the travel time of buses on the Brooker Highway relative to the private car in a cost-effective manner.

The concept of the transit corridors is not only to encourage public transport use, but encourage walking and cycling trips either as part of a public transport trip or for short trips accessing key trip attractors on the corridor. As stated previously, the Brooker Highway does not have the number of trip attractors on the corridor that Main Road has, which reduces the opportunity for using walking and cycling for short trips. The *Brooker Highway Plan* states that improving local connectivity across the highway to activity centres and residential areas is a key objective, rather than improving access along the corridor.

4.2 Rail corridor

In addition to Main Road and the Brooker Highway, there is potential to re-use the existing rail corridor from Brighton to Hobart Port as a transit corridor. Historically, the rail corridor provided a duplicated rail line between Hobart and Claremont. One part of the alignment has been converted to the intercity cycle way, while the remaining segment continues to be used for rail freight.

Function: Rail freight traffic is likely to cease using the rail corridor once the Brighton Transport Hub is operational, as there is no foreseeable demand for rail freight south of Brighton. Adjacent to the rail corridor is the intercity cycle way, which runs from Claremont to the Hobart Cenotaph.

Re-use of the rail corridor has the potential to support faster travel times, particularly for passengers travelling during peak periods from the Northern Suburbs to Hobart. The rail corridor alignment passes directly through the residential areas of Claremont, Berriedale, Rosetta, Montrose and New Town and is adjacent to the key activity centres of Glenorchy, Moonah and the New Town shopping centre located on Risdon Road. Because of its alignment, the rail corridor does not offer direct access to the inner Northern Suburbs of Hobart south of New Town, or the strip shopping along both New Town Road and the activity centre of North Hobart.

The types of trips expected to be taken on the rail corridor would be largely influenced by distances between stops, which in turn will be decided by the primary function of the rail corridor. If the rail corridor is to act as a higher speed commuter service, a small number of stations would be provided. This would allow a higher average speed and reduce running time between the Northern Suburbs and the key destinations of Glenorchy and Hobart CBD. If there is a greater emphasis on local trips, the distance between stops would be reduced, with a corresponding decrease in average speed and subsequent increase in travel time. This would be likely to have wider appeal, mimicking the existing all-stops Main Road bus service, but its attractiveness for commuters would be correspondingly reduced. The ability to provide for both limited stops and all-stops services would be dictated by the capacity of the rail alignment, and physical ability to provide passing loops.

The greater the emphasis on speed and commuter travel, the more likely it is that a parallel service would be required, offering local transport connections to points between the rail stations.

There are a number of options to re-use the rail corridor including:

- Light rail on the existing rail corridor.
- Guided or unguided bus rapid transit on the existing corridor.
- Light rail or bus rapid transit using sections of the existing rail corridor and existing road network.

Any re-use of the rail corridor is presumed to only refer to the existing rail line, and that the intercity cycle way will remain intact.

Congestion: The rail corridor has the capacity to provide a congestion-free link from the Northern Suburbs of Hobart by providing a dedicated right of way for public transport.

Public transport priority and previous studies: The rail corridor provides the opportunity for public transport to use an existing transport corridor which has priority over other modes at intersections on the corridor. It is assumed that if public transport used the rail corridor it would retain priority over other modes at intersections. This has the opportunity to create faster travel times for public transport, but may also cause delays along higher volume sections of the road network intersecting with the rail corridor, such as Elwick Road and Derwent Park Road. Depending on the frequency of public transport using the rail corridor, there may be an impact during peak times with cars queuing at level crossings.

The re-use of the rail corridor has been the subject of four separate studies since 2009:

- Parsons Brinckerhoff, in 2009, considered the re-use of sections of the rail corridor between Bridgewater and Granton and Austins Ferry to Moonah, as part of a Northern Suburbs light rail system which also incorporated sections of on-road running.
- Pitt and Sherry, in 2009, examined the cost of converting the rail corridor, between Claremont and Hobart, as a bus lane.
- ACIL-Tasman, 2011 examined the use of the rail corridor between Brighton and Hobart for light rail.
- Parsons Brinckerhoff, 2011, considered the conversion of the rail corridor between Claremont and Hobart for bus rapid transit.

These studies are discussed further in Appendix A.

Integration of land use planning: The rail corridor is within walking distance of Glenorchy, Moonah and Hobart CBD activity centres and the New Town shopping centre at Risdon Road (within 800m), although it does not penetrate the core of these centres. The rail corridor is not within walking distance of the New Town shopping strip further south along Main Road and the activity centre of North Hobart. The rail corridor is also located near other significant attractors, such as a number of large educational institutions.

The area along the corridor from New Town to Claremont Link Road is also identified as part of the residential infill area in the *Southern Regional Land Use Strategy.* The corridor is within walking distance of Claremont, parts of Moonah and New Town which are considered medium to higher density residential areas in the Greater Hobart context. The rail corridor has a lower population catchment within walking distance than the Main Road corridor. From Claremont to Hobart, the rail corridor catchment has a population of 10 567 persons within walking distance (0-800m).

Development around the rail corridor is constrained between Hobart and New Town by the Derwent River and the existing land uses of the Queens Domain, Botanical Gardens and Hobart Cenotaph. It is unlikely that there would be any land use change between the site of the old New Town station and Hobart (with the exception of redeveloping the Macquarie Point railyards), once the freight intermodal facility moves to the Brighton Transport Hub.

The rail corridor runs through industrial and commercial land between Moonah and Glenorchy. The re-introduction of public transport services may be a catalyst for redevelopment of this land towards higher residential densities and more mixed use. A significant shift would be required in land use policy to create higher density transit-oriented developments (known as 'TODs'). But there are successful examples of this occurring in other jurisdictions. The conversion of this land to higher order uses is partly dependent on the supply and demand of industrial land within Southern Tasmania, which is currently subject to a study which is expected to be completed by the end of 2011. Industrial land within Moonah has been identified as an infill area in the draft *Southern Regional Land Use Strategy,* while industrial land at Derwent Park is outside the infill area.

Although land between Claremont and Glenorchy had been identified as an infill area, most of this is located in existing residential areas which have already been developed suggesting that there appears to be limited non-residential land available to convert to residential use. A change in land use policy would also be required to convert this land to higher residential densities.

Public transport frequency: There are currently no public transport services operating on the rail corridor. The frequency of any future service would be dictated by demand, and the initial capacity of the rail corridor for the preferred mode. Public transport frequencies on the rail corridor would also be influenced by the extent to which it is necessary to maintain a parallel service on the Main Road, and the funding available to support services on both corridors.

The width of the rail corridor has eroded over time, and there are limited opportunities to expand the corridor without affecting the intercity cycle way or development adjacent to the corridor. The current width of the corridor poses some operational capacity constraints, particularly in respect of bus rapid transit which requires wider lane widths than light rail. An unguided bus rapid transit system would be limited to a one way directional flow for width reasons.

There are also likely to be constraints for light rail and guided bus rapid transit, as there are limited opportunities for extended passing loops on the corridor. This is likely to affect service frequency for services operating on both directions on the corridor.

Targeting the wider people movement task: The strength of the rail corridor for public transport is its capacity to move a large number of people between key points in the Northern Suburbs into Glenorchy and the Hobart CBD in a reasonable time, with a lesser role in supporting counter-peak travel to the Northern Suburbs, particularly for tourism and special events. This makes the rail corridor well suited to the existing weekday peak, for those commuters for whom part or all of their trip can be completed on the rail corridor.

The capacity of the rail corridor to support more 'undirected' passenger trips is dependent on both the number of stopping points provided and, more importantly, the quality of the bus services feeding into and away from the corridor. It is clear that the rail corridor could not

meet the transport needs of the inner Northern Suburbs and it is likely that, whether operated as bus rapid transit or rail service, the distance between stopping points on the rail corridor would be sufficiently great to warrant a public transport service, operating in parallel on Main Road.

The question remains as to whether demand for public transport services can, or will, justify the likely level of investment required to convert the rail corridor to a dedicated public transport corridor. ACIL-Tasman's work suggests that even under conditions of very strong demand, the overall benefits of light rail would only marginally exceed overall costs.

Similar capital costs for bus rapid transit along the entire length of the corridor (Claremont to Macquarie Point) suggest a similar conclusion. However the option of buses making use of shorter sections of the corridor has not been closely examined.

4.3 Main Road

Main Road is the only Northern Suburbs corridor that has not been investigated in detail from a transit corridor perspective. There is a need to better understand the role of Main Road as a major public transport thoroughfare and the nature and extent of changes required to develop it as an integrated transit corridor.

Function: Main Road is an important intra-urban road linking Glenorchy, Moonah, New Town, North Hobart and the Hobart CBD. It is a critical public transport route, with bus services operating at a high frequency during weekdays. During the morning peak Main Road has a bus frequency of every five to seven minutes. The road carries 19,700 vehicles per day at its highest volume location (about half the number of the Brooker Highway) and typically operates as a 'main street', as opposed to an urban highway.

Congestion: Main Road experiences localised congestion around high use intersections, and through the main activity centres of Glenorchy, Moonah and North Hobart. Based on 2006 travel time analysis, the AM peak inward trip from Tolosa Street to Liverpool Street, has the slowest travel speeds and travel times. There is around a one to three minute difference in travel times between the AM peak inward trip and the inter-peak inward/outward trip which suggests that Main Road unlike other arterial roads in Hobart, has a relatively consistent traffic flow all day.

There is a notable difference between travel times in contra flow directions during peak times. The AM peak has a travel time difference of 4:03 minutes between the inward and outward directions, while the PM peak has a greater difference at 4:48 minutes.

Travel times and speeds over this section are as follows:

Travel period	Travel speed	Travel time
AM peak inward	23 km per hour	18:51 minutes
AM peak outward	30 km per hour	14:46 minutes
Inter-peak inward	25 km per hour	17:36 minutes
Inter-peak outward	29 km per hour	15:25 minutes
PM peak inward	33 km per hour	13:22 minutes
PM peak outward	24 km per hour	18:11 minutes

The slower travel times and speeds can also be attributed to the function of the road as a 'main street' with frequent stopping at traffic lights. Mid block speeds are likely to be higher than the inter-peak travel speeds of 25-29 km per hour, with traffic count data indicating an average speed of 38 km per hour.

Public Transport priority and previous studies: There is no public transport priority on the Main Road, with the exception of a bus traffic signal at the junction of Main Road and Eady Street. There have been no previous studies on public transport priority on the Main Road.

The Main Road corridor does have a number of limitations in terms of bus priority. The corridor has a narrow road space with little room for expansion. The competition for road space from other transport modes, such as cars, (including parking) and pedestrians, will need to be carefully investigated in terms of mode priority. However, as Main Road will always operate as a public transport route in some form, (even if the rail corridor is utilised), there is a need to better understand the role of bus priority on the corridor.

The development of bus priority on the Main Road corridor is likely to have significantly lower infrastructure and service delivery costs than implementing other options on the rail corridor. Travel time savings are also likely to be lower, with a greater emphasis on predictability of travel time and punctuality.

Integration of land use planning: Main Road is an existing public transport route, where land use, entailing higher residential densities and significant commercial activities have developed around the corridor.

Main Road has a high number of trip attractors located on the corridor including the principal (Hobart CBD) and primary activity centre (Glenorchy), the major activity centres of Moonah and North Hobart and minor centre of New Town. It also contains other significant attractors on the corridor, such as a number of large educational institutions. The area along the corridor is also identified as part of the residential infill area in the *Southern Regional Land Use Strategy* and contains established medium to higher density residential areas around West Moonah, New Town and North Hobart, with a population density of 20-30 people per hectare. The average population density in Greater Hobart is 12 people per ha.

The Main Road corridor has more than triple the number of people within walking distance of the corridor in comparison to the rail corridor. From Claremont to Hobart, the Main Road catchment has a population of 33 858 persons within walking distance (0-800m). This level of density enables the Main Road corridor to better integrate with surrounding land use patterns.

As the Main Road corridor runs in close proximity to the rail corridor between New Town and Glenorchy, there are the same opportunities to redevelop land for transit-orientated development, including industrial and commercial land.

Public transport frequency: The Main Road experiences the highest public transport frequency of the three corridors, with buses operating every 5-7 minutes during the peak on weekdays. A total of 170 services are provided in a 24 hour period on weekdays, 32 of which are in the peak periods. As the Main Road services have slower travel times, compared to the Brooker Highway, the high frequency indicates the importance of the attractors on the corridor itself, and the demand to travel to points located along the corridor.

Targeting the wider people movement task: Consistent with the frequency of bus services, there is strong patronage on the Main Road corridor throughout the day.

During peak periods, the Main Road provides a key transport corridor for commuters moving into Hobart from the Northern Suburbs. Both Main Road and the Brooker Highway carry approximately the same number of buses during the peak, being 32 and 30 buses respectively.

The Brooker Highway has 37 percent of its services running during the peak, which indicates that it its function is predominately an express peak services for commuters. In comparison Main Road has 19 percent of its services operating during the peak illustrating how it targets the wider passenger transport task throughout the day.

Demand along Main Road is sustained by a wide range of people travelling into the Hobart CBD and to points between Glenorchy and Hobart. The Main Road corridor operates as a trunk route with services feeding into the corridor from outer Northern Suburbs eg. Bridgewater, and inner suburbs of West Moonah and Lenah Valley.

5 CONCLUSION

Based on this review of the three potential transit corridor options from Glenorchy to Hobart CBD, it is recommended that Main Road should be the focus of the first transit corridor investigation for the following reasons:

- The Brooker Highway is not a suitable transit corridor, as it is Hobart's key urban highway with a high freight and car based passenger function as opposed to a core public transport route. Previous bus priority modelling on the highway indicated modest travel time benefits for buses, whilst cars would experience significant delays. The function of the Brooker Highway does not support increased land use density and activity around the corridor from a land use planning perspective.
- The rail corridor has been the subject of four separate studies that have assessed the potential role of the corridor for public transport. The transport issues, including public transport priority, potential stops and likely demand are well understood from these studies. The work completed to date suggests that the capital costs of refurbishing the rail corridor may outweigh the potential benefits of using the corridor. While further time could be invested in analysing less direct benefits in greater detail, this course of action would only be appropriate if it was clear that the rail corridor was the only transit corridor option in the Northern Suburbs.
- Main Road is an existing public transport route with a higher proportion of the population within walking distance of the corridor than other corridor options. It also contains major trip attractors and is integrated with surrounding land use patterns, such as high residential densities and mixed use. The development of a transit corridor on Main Road is also likely to have significantly lower infrastructure and service delivery costs than implementing other options on the rail corridor.
- In spite of the high public transport numbers and frequency, no serious analysis has been undertaken of what the Main Road can potentially deliver. Regardless of the ultimate decision on the rail corridor, public transport services will be likely to continue to be required from Glenorchy to Hobart via Main Road.

6 APPENDIX A

Light rail on the existing rail corridor

Light Rail Business Case: The State Government commissioned a Business Case for the development of a light rail service between the Hobart CBD and Northern Suburbs, which was completed in late August 2011.

This Business Case was restricted to a very detailed examination of a light rail service terminating at Claremont, as the cost of services beyond Claremont was found to be far greater than the likely demand, and flow on benefits, could justify. It was proposed that the service would terminate at the southern side of Davey Street (Mawson Place) at the Hobart end although analysis showed that extension of the service to Elizabeth Street just south of Davey Street would increase the attractiveness of the rail service by reducing end of trip walking distances.

The Business Case concluded that the capital cost to establish a rail service between Mawson Place and Claremont, at a 15 minute frequency (weekdays), would be approximately $80 million for the lowest feasible cost option which utilised diesel-powered rail vehicles. Considerable work would need to be undertaken on the track to make it suitable and safe for passenger use; costing between $33 million and $45 million (the overhead electrification option is more costly). The cost of rolling stock would be approximately $25 million. Maintenance and operating costs would be roughly $10-11 million per annum, after an initial period of five years where the upgraded track would require little maintenance.

The travel time between Claremont and Mawson Place is estimated to be 20 minutes for electric vehicles and 22 minutes for diesel-powered vehicles, with an average travel speed of 40-45km per hour allowing for stopping time at the proposed stations. The track would be upgraded to allow a maximum speed of approximately 60 km per hour. The average travel time is affected by both the alignment of the rail corridor and the number of level crossings along the line.

The Business Case assumed that feeder bus services could be provided to the rail corridor at Claremont and Glenorchy. A park and ride facility with approximately 300 parking spaces was assumed to be provided at Claremont, together with 700 additional informal spots along the rail line.

The Business Case concluded that under ordinary conditions the operating and capital costs of a light rail system would represent a significant net cost to the community. The findings indicated that a light rail system would require patronage to be significantly influenced by a 'sparks effect' to achieve over 90,000 boardings per week (or 250 percent higher than the patronage estimates made by taking account of demand for light rail arising from a range of different sources, but without a 'sparks effect'), in order for the benefits to exceed the costs.

Current patronage levels for public transport use through the area are estimated to be between 20,000 and 25,000 passengers a week.

Bus rapid transit on the rail corridor

Previous analysis: In 2009 DIER undertook a high level analysis of the rail corridor from a bus rapid transit perspective to supplement the *Hobart Passenger Transport Case Study*. This desktop cost estimate indicated that conversion of the corridor to an unguided bus-way from Claremont to Hobart would cost a total of $115 million, or $7.7 million per km. This costing is based on removing the existing rail line and building the formation for a new road corridor, which is a single carriageway 4.8m in width, development of safety barriers and new bus stations. The railway line is required to be removed to build the formation of the road. Options to reinstate the railway line within the road could also be explored.

Through Parsons Brinckerhoff, Metro Tasmania has also recently undertaken a preliminary assessment of bus rapid transit for the purposes of its Network Plan (which is presently in draft form). This assessment was a 'desk top' preliminary engineering assessment. The assessment indicated that a one-way bus rapid transit would require a total cross section of 12.1m allowing for retaining the existing intercity cycleway, but not retaining the existing cut and fill batters, or providing space for crash barriers. It found that a one-way bus way would be constrained at certain points in the corridor, without removal of existing cut and fill batters and widening of rail bridges at Risdon Road and Humphreys Rivulet. Land acquisition or design optimisation to minimise cross section requirements may be required at these pinch-points. The assessment indicates that it is unlikely that a bus rapid transit system could be accommodated fully within the rail reserve without construction of retaining structures or other earthworks to widen the corridor; this would have significant cost implications for construction works.

There are also likely to be some operational issues associated with one-way peak directional bus rapid transit system. Buses would need to run on-street in the counter-flow peak, which may cause confusion to passengers with different points of access depending on the direction of travel. There are also a proportion of passengers who travel from Hobart CBD outwards towards Glenorchy in the AM peak that would not benefit from a bus rapid transit system in the counter-flow peak.

Feasibility of bus rapid transit: Based on previous costings obtained by DIER, the total construction cost of a bus rapid transit is likely to be roughly comparable to that of a light rail system. The light rail system is estimated to cost between $33 million and $45 million to construct, with a total capital expenditure of a minimum of $80 million (which includes rolling stock), while bus rapid transit is estimated to cost $115 million to construct. However, the bus rapid transit estimate entailed less rigorous analysis, and a 'lowest effective cost' approach could produce an estimate closer to that obtained for the light rail options.

Based on the Light Rail Business Case, light rail requires a demand of 90,000 passengers per week in order for the benefits to outweigh the costs. This means a 250 percent increase in base level demand (ie. without a 'sparks effect') within the area. It is highly unlikely that bus rapid transit would be able to generate a higher demand than light rail, as the 'sparks effect' usually considered to accompany a light rail development is arguably less for bus rapid transit. Therefore, it is likely that (unless the construction costs were shown to be dramatically lower than existing estimates) the overall costs of bus rapid transit would also exceed the benefits.

Public transport demand within Northern Suburbs: It should be noted that public transport demand in Glenorchy can never entirely be met by a bus rapid transit service run wholly on the rail corridor, due to the limited stops it would make and non-proximity of the corridor to residential areas and major attractors south of New Town. It would be essential that bus services continued to operate to meet such demand.

Flexibility of bus rapid transit: The advantage of bus rapid transit over rail does not appear to lie in the capital cost, but rather the operational flexibility buses can offer. Light rail can only operate along the corridor, while potentially buses can enter and leave the corridor quite easily, meaning that passengers do not have to switch modes. It is also easier to increase frequency, as more of the existing bus fleet can be allocated to the service, whereas to increase light rail frequency means that additional trains would need to be purchased, which is costly (one unit of light rail rolling stock is estimated to cost $3-5 million).

Future corridor options: The bus rapid transit option does not completely remove the opportunity for using the rail corridor for passenger rail in the future, as the roadway could be constructed to contain a railway line within it. However this would be an additional construction cost that is unlikely to be economically viable. Alternative proposals to incorporate rail in the roadway have not been explored.

Shorter bus rapid transit options: An alternative, shorter bus rapid transit system could be a future option, whereby buses use the rail corridor to bypass congested sections of Main Road. The *Light Rail Business Case* suggested using bus rapid transit on the rail corridor between Chapel Street (Glenorchy) and Bay Road (New Town) as a potential cheaper option. This option has not been costed, but if the costs per kilometre for the shorter bus-way match those of previous estimates, the total cost would be roughly $33 million.

The assessment for Metro by Parsons Brinckerhoff also identified the opportunity to deviate bus rapid transit from the rail corridor to other corridors (such as Main Road) to increase the patronage catchment and provide for improved land use integration. Such deviations could include the existing Glenorchy bus mall, New Town shopping centre at Risdon Road and North Hobart.

Guided bus systems: Using the rail corridor as a guided bus-way has been proposed in the past. Adelaide currently operates the O-Bahn, which is a guided bus-way running on a purpose built concrete track, with buses using guide wheels to travel over (and stay within) the track. The O-Bahn does not contain a railway line and DIER has not identified any examples of buses using a bus-way guided system over a railway line, except for short sections of track where guided buses share road space with trams (eg Essen in Germany). It is unclear whether a guided bus-way would allow preservation of the current rail line for future use.

In Adelaide, the cost of building the 12km O-Bahn track in 1986 (together with acquiring new buses and retrofitting them) was $98 million; these costs are likely to be significantly higher in today's dollars. The advantage of the O-Bahn is that, as it is a guided system, it can reach higher travel speeds and use less space (approximately 2.5m lanes) than a standard bus rapid transit system. The key issue with the current rail corridor is that it has a high number of level crossings, so that travel speed would be reduced along the corridor because the bus has to disengage from the guided system when traversing normal road surfaces. Travel time could only be increased through grade separation, or road closures. New or retrofitted buses would also be required for a guided system.

Alternative rail corridor

Previous analysis: Preliminary investigation of using an on-road light rail system along the Main Road corridor from New Town Rivulet to Hobart CBD was undertaken as part of the initial costing of light rail services (from Hobart CBD to Green Point) by Parsons Brinkerhoff in 2009. This alternative alignment from the rail corridor was designed to increase the population catchment within the public transport corridor. The report indicated that an on-road system between Hobart CBD and New Town Rivulet would be very expensive, with a total estimated cost of $175 million, at an average of $36 million per km.

Department of Infrastructure, Energy and Resources

10 Murray Street,
Hobart TAS 7001
Ph: 1300 135 513
Visit: www.dier.tas.gov.au