AECOM

Tasmanian Government Department of
Infrastructure, Energy and Resources

11 December 2012

Hobart Northern Suburbs Light Rail

Business Case Peer Review

Hobart Northern Suburbs Light Rail

Business Case Peer Review

Prepared for

Tasmanian Government Department of Infrastructure, Energy and Resources

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3553 2000 F +61 7 3553 2050 www.aecom.com
ABN 20 093 846 925

11 December 2012

60277500

AECOM in Australia and New Zealand is certified to the latest version of ISO9001 and ISO14001.

Quality Information

Document Hobart Northern Suburbs Light Rail

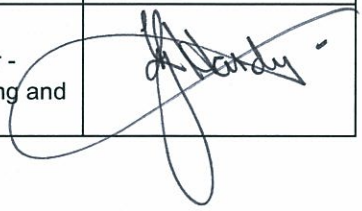
Ref 60277500

Date 11 December 2012

Prepared by Andrew Malowiecki, Sarah Ison, Jemima Hutch

Reviewed by Geoff Hardy

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	25-Oct-2012	Draft for Issue	Geoff Hardy Industry Director - Strategic Planning and Advisory	Original Signed
B	06-Nov-2012	Second Iteration Draft	Geoff Hardy Industry Director - Strategic Planning and Advisory	Original Signed
C	15-Nov-2012	Third Iteration Draft - Includes Part 2	Geoff Hardy Industry Director - Strategic Planning and Advisory	Original Signed
D	04-Dec-2012	Final Draft Report	Geoff Hardy Industry Director - Strategic Planning and Advisory	Original Signed
1	11-Dec-2012	Final Report	Geoff Hardy Industry Director - Strategic Planning and Advisory	

Acronyms

ABS	Australian Bureau of Statistics
AT	ACIL Tasman
ATC	Australian Transport Council
BCR	Benefit Cost Ratio
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BVG	Berlin Transport Services (Germany)
CAP	Community Advisory Panel
CBA	Cost Benefit Analysis
CBD	Central business district
CD	Census Collection Districts
CPI	Consumer price index
DDA	Disability Discrimination Act
DIER	Department of Infrastructure, Energy and Resources
FTT	Future Transport Tasmania
HNSLR	Hobart Northern Suburbs Light Rail
HNSRAG	The Hobart Northern Suburbs Rail Action Group Inc
IA	Infrastructure Australia
KPI	Key Performance Indicator
LGA	Local Government Association
LRBC	Light Rail Business Case
LRS	Light Rail System
MONA	Museum of Old and New Art, Tasmania
NPV	Net present value
NSLRS	Northern Suburbs Light Rail System (another term for the HNSLR)
NSW	New South Wales
OOSM	Optimal operating service model
PA	Per annum
PIA	Planning Institute of Australia
PT	Public transport
PTA	Public Transport Authority
PV	Present value
QLD	Queensland
RACT	Royal Automobile Club of Tasmania
RTA	Roads and Traffic Authority, now called the Roads and Maritime Services (NSW Government)
SEIFA	Socio-Economic Indexes for Areas
SMT	Strategic merit test
TMR	Department of Transport and Main Roads (Queensland Government)
TOD	Transit orientated development
UK	United Kingdom
VOC	Vehicle Operating Cost
VOT	Value of Time
WA	Western Australia
WEB	Wider Economic Benefits

Table of Contents

Executive Summary

Overview

AECOM has been commissioned by Tasmanian Government Department of Infrastructure, Energy and Resources (DIER) to undertake an independent review of the Hobart to Northern Suburbs Light Rail (HNSLR) Business Case prepared by ACIL Tasman during 2011.

The purpose of this document is to detail the findings of the peer review process, and is split in to two sections:

- Part One documents the findings of the peer review of the HNSLR business case
- Part Two outlines the Community Advisory Panel submissions regarding the HNSLR business case, and provides responses where possible in line with the business case peer review process.

A further overview of the key findings from the two parts of the report is set out below, before an overall summary of findings is provided.

Part One: Peer Review of HNSLR Business Case

The objective of the Peer Review was to ensure that the assessment of economic benefits and costs associated with the light rail business case was justified and appropriate. This was particularly relevant to Stages 1 and 3 of the original HNSLR business Case. In order to complete this work, the peer review process has two key components:

1) Review the economic parameters and the values assigned to those parameters.
2) Review the approach taken, including benefits considered and methodology used to forecast passenger demand.

Part One of this report documents the outcomes of the findings of the peer review, within the following sections:

Section 1.1: introduction to the peer review and the approach used.

Section 1.2: the appropriateness of the economic parameters used.

Section 1.3: the use of the key demand generators, namely the inclusion of transit orientated development and the use of the Sparks Effect.

Section 1.4: the calculation of the benefit stream.

Section 1.5: the appropriateness of the cost parameters used.

Section 1.6: the cost-benefit analysis approach, particularly with regard to consumer and producer surplus.

Section 1.7: the use of non-monetised costs and benefits to describe difficult to quantify and wider economic costs and benefits.

Section 1.8: The appropriateness of the sensitivity testing application.

Section 1.9: The application of Value Management Optimisation in the assessment of the optimal length of the HNSLR Line

In addition, throughout Part One, comment has been made as to whether the method used is in alignment with Infrastructure Australia (IA) requirements (Infrastructure Australia, 2012).

Summary of Findings

It is the Peer Review team's finding that the HNSLR Business Case prepared by ACIL Tasman for the Tasmanian Government Department of Infrastructure, Energy and Resources (DIER) is in essence a fair and sound appraisal of the economic benefits and costs of the HNSLR project. It also generally adheres to the requirements of Infrastructure Australia.

However, overall the Business Case is likely on the optimistic side, with some capital and operating costs below what could be expected for this project. In addition, there are some capital costs, operating costs and operational caveats that have not been appropriately accounted for in the project case and when these adjustments are accounted for, inevitably the project will not have a positive NPV or favourable BCR.

In addition, the inclusion of the strong demand generators (TODs and 'Sparks Effect') has also likely artificially increased patronage, and therefore the benefit stream.

While the implications of TOD development on HNSLR patronage and consumer surplus have been applied by ACIL Tasman using a satisfactory method, it must be recognised that their assumptions are highly optimistic and in reality, the overall impact of TOD development on the light rail patronage may not be realised in full given the population, timing and regulatory environment in which it will operate.

Further, the inclusion of the strong Sparks Effects artificially inflates demand and there is limited evidence the effect exists let alone if it can be generated practically by changing the utility and costs of each passenger trip. Unless other attributes are apparent, the presence of having rail based mode on its own cannot be assumed to generate such significant levels of additional patronage.

It is acknowledged that the provision of a Light Rail system in Hobart may offer some benefits such as:

- Providing reliable travel times and a comfortable journey for users
- Supporting the consolidation of urban form, such as supporting the development of identified TODs in Glenorchy and Moonah, in the medium to long term
- Reducing congestion on the roads in the long term, should people switch to using the light rail
- Improving access to the rest of the city for residents of Bridgewater and Brighton.

However, as highlighted by ACIL Tasman in the Stage 3 Report (page 26), and an assertion the peer review team supports, patronage on the HNSLR is forecast to be low due to the fact that too few people obtain travel-time savings from switching to rail, and thus are unlikely to do so. As such, the estimated benefits do not outweigh the capital costs that are needed to upgrade the existing freight line for passenger rail, as well as the ongoing operational costs that would be required to manage the line.

If an increase in patronage were to occur along the lines of a strong Sparks Effect (due to the attractiveness of rail due to safety, reliability or comfort), it may be that patronage numbers increase to such a large extent as to make the investment in light rail economically feasible. However these assumptions are very optimistic and come with very high risks, and based on current analysis of the Greater Hobart region, this outcome would be highly unlikely.

In addition, the provision of light rail alone cannot be assumed to provide the uplift in the use of public transport that would be required to see a large shift in patronage. As a minimum, the provision of light rail would need to be supported by significant changes in the Greater Hobart community, such as changes to the local government planning schemes to support TODs through regulations regarding higher density along the rail line, and reducing the provision of car-friendly developments. This would be the minimum likely required to see an increase in patronage beyond which might be expected based on the current travel options and habits. It is not clear to date that this additional investment and regulatory reforms have been committed by the relevant stakeholders. And that broad community support is there for these changes.

In addition to the assessment of the Business Case, value optimisation analysis assessment of the optimal length of the HNSLR line, showed that, based on current population levels, Glenorchy is the best choice for a northern terminus since its overall net costs are the lowest and it is not only a major generator but also an attractor of trips. Extending the line beyond Glenorchy would worsen the BCR, NPV and cost recovery.

Part Two: Community Advisory Panel Submissions

Part Two of this report, starting on page 42, responds to submissions from the Community Advisory Panel of the HNSLR Business Case Project who provided written submissions regard their concerns about the original business case. Having regard for the terms of reference for the Peer Review, the peer review team's responses to submissions focused on responding to points raised regarding the business case / IA process.

In total six responses were received from the following organisations:

- Glenorchy City Council
- Hobart Northern Suburbs Rail Action Group
- Planning Institute of Australia
- Dr Stewart Williams, University of Tasmania

- Future Transport Tasmania
- Hobart City Council.

Summary of findings

A number of concerns were raised consistently in the CAP submissions including:

- The Business Case focused on the economic over the social and environmental costs, and that more importance should be placed on the importance of the Non-Monetised Costs and Benefits.
- Inappropriate or changes in the underlying conditions and parameters, such as the cost of petrol and the cost of parking.

These concerns have been addressed throughout Part One and Part Two of this report, with responses to individual comments and concerns address in Part Two.

In addition to the above, the CAP submissions also raised a number of issues which, while outside the scope of the business case peer review, are of particular importance to note:

- The importance of public transport improvements (light rail or otherwise) in supporting the future strategic land use planning activity in the region. In particular, the Regional Land Use Strategy is important and relevant in that it identifies containment of growth within an urban growth boundary and densification along high frequency public transport corridors as key strategy.
- General community feeling that there is a need to preserve the current freight rail corridor for public transport purposes. This includes the possibility of investigating either a less expensive public transport option for the freight route.

These key strategic planning concerns are of significant importance to the future of the development of Greater Hobart and should be considered within the wider strategic planning framework by DIER and the wider Tasmanian State Government.

It is clear from the strategic planning aspirations for Great Hobart and community interest and concern in the HNSLR, that there is a real need within Hobart to improve public transport system to support urban consolidation and improve the liveability of the city for its residents.

However, investigation of the HNSLR business case, and this peer review, has demonstrated that the HNSLR in its current configuration along the existing freight line, from Claremont to Hobart, would not be economically viable. This is due to the low patronage numbers that it will likely generate, as compared to the high costs.

Alternate options put forward by CAP members may be considered further investigation by DIER include:

- Improvements to the existing bus network
- Establishment of public transport route along the identified transit corridor of Main Road/Elizabeth Street.

Part One

1.0 Peer Review of HNSLR Business Case

1.1 Introduction

This section of the report provides an overview of the project and the purpose of this report. It also provides a summary of the key documents used during the review.

1.1.1 Project Overview

AECOM has been commissioned by Tasmanian Government Department of Infrastructure, Energy and Resources (DIER) to undertake an independent review of the Hobart to Northern Suburbs Light Rail (HNSLR) Business Case prepared by ACIL Tasman during 2011.

This report documents the outcomes of this peer review, particularly in regard to the following aspects of the HNSLR Business Case:

- economic parameters used
- the application of the "Sparks Effect"
- cost parameters used
- methods of calculating benefits
- the use of the Consumer Surplus Approach
- inclusion of difficult to quantify or excluded benefits and costs
- sensitivity testing application
- the application of Value Management Optimisation.

Throughout the document, comment has been made as to whether the method used is in alignment with Infrastructure Australia (IA) requirements (Infrastructure Australia, 2012).

1.1.2 Peer Review Terms of Reference

The objectives of this peer review are as follows, as set out in the Request for Tender:

The objective of the Peer Review is to ensure that the assessment of economic benefits and costs associated with the LRBC was justified and appropriate. The Department needs to be confident that the final BCR reflects a robust assessment of the likely feasibility of the project.

The Department seeks assessment of the overall economic evaluation conducted in Stage 3 as well as the scoping exercise conducted in Stage 1. In particular, the Department has to be confident that the approach and values used are appropriate for use as part of submissions to Infrastructure Australia (IA).

The work required has two components:

1) a review of economic parameters and the values assigned to those parameters; and

2) a review of the approach taken, including benefits considered and methodology used to forecast passenger demand.

1.1.3 An Introduction to Cost Benefit Analysis

Cost Benefit Analysis (CBA) provides a framework for organising information, listing the advantages and disadvantages of each alternative course of action in terms of economic values and ranking alternatives on the criteria of net economic value.

The conventional CBA method is to compare project cases with a "base case" which is nominally a "do minimum" or "do nothing" scenario. The CBA analysis is undertaken from the viewpoint of the impact on the welfare of the society in general. Thus if net benefit (gross benefits minus gross costs) of the project is positive, the society is better off. Of course the benefits and costs may not be equitably shared across the society but the underlying principle is that the welfare gainers can compensate the losers thus nobody is worse off and some are better off as a result of the project. The distribution of costs and benefits within the society is beyond the scope of this report.

Costs and benefits are measured in terms of economic or resource costs. In line with conventional practice, these are valued in real (not monetary) terms and specifically exclude taxes, subsidies and transfers. A real discount rate is applied to correctly account for the accrual of costs and benefits over time.

In the conventional approach, residual or unexpired values of equipment and resources are treated as negative cost elements at the end of the appraisal period.

1.1.4 Definition of Base and Project Cases

The ACIL Tasman Business Case delivered an assessment of both the base case and project case for the HNSLR project. The base was "business as usual" without the addition of the HNSLR.

The project case considered the expected patronage, and subsequently consumer surplus, for the HNSLR project under a variety of patronage scenarios ranging from 'no Sparks Effect' (without any external impacts to generate additional patronage) through to 'strong Sparks Effect', such as in the WA Perth - Mandurah Rail example.

To define the project case, ACIL Tasman acknowledged that rail systems *"may have an intrinsic attractiveness which is not possessed by other modes of public transport. Therefore, a model that considers only cost savings (chiefly, travel time saved) could underestimate potential demand. Higher levels of demand were therefore entered into the model to mimic different levels of the 'Sparks Effect' as the intrinsic attractiveness of rail compared to other public transport modes is sometimes known."* (Summary Report, page IV)

1.1.5 Context of the Business Case

The original business case investigated the feasibility of a rail service between Hobart CBD and Hobart's northern suburbs. The business case comprised of three stages:

1) An initial background stage which described the context and setting of the project as a whole, as well as establishment of broad parameters for the remainder of the project, such as the desired route length.

2) Development of optimal operating service models (OOSM), containing all costing associated with the physical; construction and operation of an optimal light rail service.

3) Calculation of economic benefits and costs associated with OOSM, including modelling demand for a light rail service, the calculation of benefits associated with the rail service BCR calculation.

The original Business Case was developed by ACIL Tasman in the following style:

> *The reason for this report is two-fold. In the first instance, it provides information important for any future submissions to Infrastructure Australia to fund the light rail system. For this reason, it has a structure very similar to an Infrastructure Australia submission, and considers issues important to Infrastructure Australia. Secondly, however, it provides background to the remainder of the project. In particular, it outlines the results of a high-level feasibility analysis of the light rail system, section by section* (Stage 1 Report, page 1).

It is important to understand this approach at the review outset as it has implications on the costs and benefits used and developed for the original Business Case.

1.1.6 Key Reference Documents

The following documents were reviewed with regard to the Business Case:

- Light Rail Business Case summary report
- Stage 1 Background Report and Stage 1 Questions and Answers
- Stage 2 Optimal Operating Service Models
- Stage 3 Economic Evaluation and Stage 3 Questions and Answers.

These reports can be found on the DIER website:
http://www.transport.tas.gov.au/miscellaneous/northern_suburbs_to_hobart_cbd_light_rail_business_case

In addition, several supporting documents were provided by DIER which provided background material to the reports, including:

- documentation related to the 'Sparks Effect'

- bus patronage data
- DIER (2010a) *Park and Ride Community Transport Survey*
- DIER (2011) *Congestion in Greater Hobart*
- DIER (2010b) *Greater Hobart Household Travel Survey*.

The following key reference materials were also used during the review:

- Infrastructure Australia, 2012, *Infrastructure Australia's Reform and Investment Framework: Guidelines for making submissions to Infrastructure Australia's Infrastructure Priority List using the Reform and Investment Framework*.
- Australian Transport Council (ATC), 2006, *National Guidelines for Transport, System Management in Australia*.
- Austroads Ltd., 2012, *Guide to Project Evaluation Part 4: Project Evaluation Data*.

Reference has been made to other relevant documents by Queensland Government Department of Transport and Main Roads (TMR) (Queensland Government, 2011) and NSW Government Road Transport Authority (RTA) (RTA, 1999).

1.1.7 Definition of Light Rail

It is necessary to first clearly define what is meant by 'light rail' in the context of the Business Case. A light rail systems provides the middle tier to a public transport hierarchy. Light rail can be provided as on-road or off-road infrastructure and can serve "middle distance" and / or "short distance" trips, depending on the design of the system.

Figure 1 shows a simplisitc rail heirachy, essentially as one moves to the "higher order" train services, passenger capacity and speeds increase as does costs and accessibility (distance between stations).

Figure 1 Public Transport Continuum

The basic light rail concept as outlined by Hyder Consulting in the Stage 2 Report is:

- Line of sight operation so no need for centralised train control as in heavy rail systems.
- Very good emergency brakes enabling potential use on shared corridor with cars, buses etc. This may obviate the need for expensive booms gates and signalling at level crossings.
- Usually low floor and level boarding avoiding the high expense of train stations and ancillary facilities. Most units are 30 - 40 metres meaning boarding platforms can be developed cheaply. These factors contribute to lower cost of providing facilities for people with disabilities.
- Usually more frequent service than normally possible with trains.
- Fewer stops than trams but more than heavy rail. There are trade-offs with transit speeds and access to catchments and passenger convenience.
- Partial separation into the dedicated corridor enables higher than tram speeds to be achieved.
- Steeper gradients, sharper curves.
- Light rail features line of sight operation like some Melbourne trams.

1.2 Economic Parameters

In calculating a Benefit Cost Ratio (BCR) for the HNSLR Business Case, a number of assumptions were made with respect to economic parameters. AECOM has assessed the values assigned to such parameters and considered whether such values are reasonable. The parameters considered are set in **Table 1** below.

It is not clear from the reports as to what the expected date of construction and operation would be. While this in itself is not necessary for the cost benefit analysis, it has been assumed that all values were converted to a single reference year, to ensure comparability across the various components.

A conventional approach is to assign the major capital costs to year zero with the project operations for day 1 of year 1. The HNSLR Business Case then assembles the capital and operating costs and expenses them as an annuity. This annuity was developed against a borrowing rate of 7% for the capital items such as track and rollingstock but was also applied to maintenance and operating expenses as a pseudo discount rate. This approach may cause problems when sensitivity testing is performed at discount rates at 4% and 10% yet the cost stream has already been discounted at a 7%.

Table 1 Economic Parameters Review

Parameter	Utilised	Alignment with IA	Relevant References
Real Discount Rates	4%, 7%, 10%	Aligns with IA guidelines. However, there may be issues with sensitivity testing as outlined in the text above.	(Infrastructure Australia, 2012) Section 4.4.3, page 19
Evaluation Period	30 years	Aligns with IA guidelines.	(Infrastructure Australia, 2012) Section 4.4.7, page 19
Residual Value	Not included	Does not align with IA guidelines According to the IA guidelines, for infrastructure assets with a life of more than 30 years, a residual value should be included. However, it noted that for this case, the assets with an economic life of greater than 30 years, the residual value may be estimated at approximately $3.8 million[1], which would not be a “game changer” for the BCR.	(Infrastructure Australia, 2012) Section 4.4.7, page 19

[1] Based on Capital Costs found in Table 4 of the Business Case Report with the following economic life assumptions: Track (100 years), Structures (100 years), Stations (50 years), Rolling Stock (35 years). Remainder of capital costs have an economic life of less than 30 years.

1.3 Demand Generators

This section provides a review of the key demand generators beyond the cost minimisation mode shift assessment, namely the inclusion of the impact of transit orientated development and the 'Sparks Effect'.

1.3.1 Transit Orientated Development

The HNSLR Business Case included within the project case the assumption that four transit oriented developments (TODs) would be developed along the rail line. This led to additional patronage on HNSLR and therefore led to a higher benefit steam. The validity and consequence of the inclusion of the TODs is considered below.

1.3.1.1 Overview of Transit Orientated Development

Transit oriented development (TOD) is a planning concept that promotes the creation of a network of well-designed, human-scale urban communities focused around transit stations. Underlying the principle of TODs is the general acknowledgement that there is a growing link between land use planning and transport planning in metropolitan areas. While there are various definitions in use around the world, there is common agreement that TOD is characterised by (The State of Queensland, 2010):

- a rapid and frequent transit service
- high accessibility to the transit station
- a mix of residential, retail, commercial and community uses
- high quality public spaces and streets, which are pedestrian and cyclist friendly
- medium- to high-density development within 800 metres of the transit station (i.e. the TOD precinct)
- reduced rates of private car parking.

As such, TOD refers to the set of principles applying to the broader precinct surrounding the station, rather than any single development adjacent to or above a transit station.

The concept of TOD has gained widespread acceptance in recent years and has become a common theme in strategic planning policy. The concept of TOD is to maximise the use of high capacity and high frequency public transport services through appropriate land uses and density. The benefits of TODs relate to efficiency of urban places, through facilitating the reduction of road congestion, reduced travel distances, mixed land uses and improved public realm.

1.3.1.2 The use of TODs in the HNSLR Business Case

The HNSLR Business Case includes the assumption within the project case that after five years, four new TOD precincts will be developed at Derwent Park, Moonah, Glenorchy and Claremont along the proposed HNSLR route. The Business Case then assumes that the development of these TODs will lead to additional patronage growth along the HNSLR corridor.

The characteristics of the TODs utilised within the Business Case have been based on the findings from the well-established and successful TOD development in Subiaco, Perth. As such, the assumption has been made that the TODs in Hobart will be approximately one square kilometre in size, equal to Subiaco's size. They will also support the same level of increased building densities and land uses as that of Subiaco's.

Within the Business Case CBA, ACIL Tasman assumed that residential density in each of the collection districts in the proposed TOD locations will grow equal to that of Subiaco. The approximate population density in Subiaco, which was applied for the HNSLR assessment, was approximately 2,300 people per square kilometre[2] . This density increase was applied to each of the four TOD precinct locations, effectively increasing the potential patronage capture. This is the "TOD effect". This impact of the "TOD effect" in the Project case is that patronage of the HNSLR rises substantially between year five and year ten as residents make use of it for travel. It is assumed that residents will move from other areas to areas that are within these TOD zones to generate the "TOD effect".

[2] ABS Census Data from 2006 has been used as it provides a means to directly compare with the ACIL Tasman assessment. ABS Census 2011 data is available however the business case was developed prior to its release and therefore 2006 data is more relevant for comparison purposes.

The 2,300 people per square kilometre density that was applied to the proposed TOD locations are a reasonable density given the existing density in these specific locations. To examine the potential impact that this increased density will have on the identified locations; an analysis was undertaken on the existing density of these TOD locations. For the purpose of this assessment, the Census Collection Districts (CDs) that were used are located at the identified station locations. It is no confirmed that they are the same CDs used by ACIL Tasman but they provide an estimate of density for cross-checking purposes. According to ABS Census data for 2006, the existing densities for these areas are outlined in **Table 2** below:

Table 2 Approximate Existing Densities - TOD Locations

TOD Location	CD	Area Size (square kilometres)	2006 Population	2006 Approximate Population Density (people/square kilometre)	% Increase to reach assumed TOD density (2,300 people/square kilometre)
Claremont	6040411	0.4	850	2,125	8%
Glenorchy	6041709	0.4	443	1,108	108%
Derwent Park	6040801	0.2	281	1,405	64%
Moonah	6040701	0.3	347	1,157	99%

Source: ABS Census 2006

With these densities in mind, in the HNSLR Business Case, Glenorchy, Derwent Park and Moonah would experience an approximate doubling of population density with TOD development, and Claremont would experience an increase in density of approximately 8%.

Within the Business Case, ACIL Tasman acknowledges that a period of five years to create a TOD to that is fully-functioning was an optimistic assumption.

1.3.1.3 Comparison with Hobart Strategic Planning approach to TODs

According to the *Southern Tasmania Regional Land Use Strategy 2010–2035* (Southern Tasmanian Councils Authority, 2011) the current level of investment in public transport and the lack of any high frequency, high capacity public transport, means that TODs developments are not currently considered feasible.

However, as identified in the *Southern Tasmania Regional Land Use Strategy 2010–2035* (Southern Tasmanian Councils Authority, 2011), there are TOD opportunities in Glenorchy and Moonah. In these locations, the density target for infill development to facilitate TOD type growth has been set at a relatively high level.

In Glenorchy, the residential density target is 20+ dwellings per hectare (Southern Tasmanian Councils Authority, 2011). For Moonah, the strategy outlines that some shop-top residential and increased density of surrounding residential area should be encouraged to create a higher density urban environment.

It could be that HNSLR would support these opportunities in the longer term. Even so, the strategy acknowledges that the TOD opportunities that have been identified at Glenorchy and Moonah are long term opportunities at best and would require significant planning, population growth and additional works to be a feasible development (Southern Tasmanian Councils Authority, 2011).

Other strategic planning considerations must be given to the development intents outlined in each of the relevant Local Council planning schemes. The relevant schemes to the HNSLR project are:

- Glenorchy Planning Scheme 1992
- City of Hobart Planning Scheme 1982
- Brighton Planning Scheme 2000.

It must be recognised that each of these planning schemes, through their zoning plans and regulatory code framework, must support the implementation of higher densities, mixed land use and the like, at the specific proposed locations for these planned TODs to be implemented in reality.

1.3.1.4 Review of the inclusion of TODs in the HNSLR Business Case

The TOD assumptions utilised by ACIL Tasman for the HNSLR Business Case are considered highly optimistic when taking in to account the likely future population growth, strategic planning and timing restraints in which they have been applied. The inclusion of the development of the TODs within a five year timeframe, as well as the inclusion of four TODs, not just the two TODs identified in the region's strategic planning documents, may have generated significantly higher patronage levels, thus impacting on the results of the modelling in a significantly positive way.

The ACIL Tasman Business Case outlines the estimated annual population growth trend for the period between 2004 and 2009. The following population growth rates for the relevant LGAs have been used in ACIL Tasman's modelling exercises:

- Brighton LGA = 3.0%
- Glenorchy LGA = 0.0%
- Hobart LGA = 0.4%.

These are relatively low growth rates, particularly for Glenorchy and Hobart, when compared to other urban areas across Australia. Perth for example, experienced an average annual population growth rate of 2.5% during this same five year period.

Given the population growth trends current for Hobart and surrounding areas, it is unlikely that the population of this area will reach the necessary critical mass of population and development density within the first five years of the HNSLR development to trigger the approval and facilitation of TODs in the region.

In addition, the consideration must also be given to the issues of implementing a theoretical idea of a TOD in a location such as Hobart, where the existing centres identified are established car-orientated commercial centres. Delivering TODs within these centres must then take into account these unique challenges and the ability for planners to achieve outcomes in terms of land-use change and subsequent travel behaviour change as envisaged by theories of TODs. This in turn raises the issue of planning implementation.

There is a regulatory planning and approvals process in Tasmania, and the relevant Local Councils, that will govern the implementation of TODs in the identified locations. This process however takes a significantly long time, highlighting that to have four well-established TODs passed through the planning, approval and development stage by the fifth year of the HNSLR project is unlikely.

In summary, while the implications of TOD development on HNSLR patronage and consumer surplus have been applied by ACIL Tasman using a satisfactory method, it must be recognised that their assumptions are highly optimistic and in reality, the overall impact of TOD development on the light rail patronage may not be realised in full given the population, timing and regulatory environment in which it will operate, particularly for the first five years of operation.

It is, however, acknowledged that non-quantifiable benefits could capture some of the wider benefits of support TOD development and urban consolidation, however this would need to be clearly supported by the region's strategic planning framework and have wider buy in from the community. This is further explained in **Section 1.7** of this report.

1.3.2 Sparks Effect

The HNSLR Business Case focused on the evidence of the 'strong Sparks Effect' as it relates to the WA experience, when considering the likely patronage numbers for the light rail system. AECOM has conducted a desktop literature review, including an investigation into a number of case studies, to research whether this phenomenon is replicated elsewhere and the relative "strength" of this effect. The results are set out below.

1.3.2.1 Overview of the Sparks Effect

The 'Sparks Effect' is a measure of transport mode success based on a level of attractiveness. It is most commonly applied as the intrinsic attractiveness of rail compared to other public transport modes. A factor of increased patronage can be applied to reflect this measure of attractiveness. The actual factor applied however, is yet to be empirically or conclusively determined by researchers on this topic. Various case studies have been undertaken which apply a certain factor to capture this attractiveness measure. According to some sources, this attractiveness factor can account for a patronage increase of between approximately 20% and 225%. These

factors however, must be considered in association with other factors such as improved service frequency, more effective networks and natural increase.

A UK rail study highlighted that the increased passenger appeal of an electric system over diesel system was observed in all new rail electric systems in the 1990's. This was attributed to a combination of factors, but includes the inherently faster acceleration and deceleration of the electric drive system in electric trains. These were considered to increase the attractiveness of the rail service, namely, the 'Sparks Effect' had occurred. Resulting from the findings of this study, the 'Sparks Effect' is frequently built into passenger estimates at around 20% (Kenworthy, 2000).

A similar situation occurred in Perth. In 1983, rail services were re-instated on the Fremantle line in Perth and in 1985 the line was electrified. The electrification of the Fremantle line led to a patronage increase of 20% compared to when the line was closed. This increase in patronage, most likely due to the increased comfort of electrified rail services compared to the original diesel services and increased frequency. The Minister for Planning and Infrastructure in the West Australian government from 2001 to 2008 Alannah MacTiernan stated in 2005 the following pertinent statement: "… While buses will always be an important part of the public transport system, the evidence is that rail services have the greatest ability to attract commuters who have a choice. If we are to get people out of their cars and onto public transport, rail is a much better bet" (Railway Technical Society of Australia, 2008).

1.3.2.2 The use of Sparks Effect in the HNSLR Business Case

The use of the Sparks Effect in the HNSLR Business Case CBA utilised a relatively high 'Sparks Effect' to quantify the anticipated patronage resulting from the attractiveness of rail (over current transport options). The application of the 'Sparks Effect' was analysed using two different scenarios:

1) No Sparks Effect – this is because it is difficult to specify exactly what causes the Sparks Effect, and thus hinders an ability to predict its likely size in Hobart.
2) Strong Sparks Effect – modal share as high as the best performing transport systems in Australia.

According to the HNSLR Business Case, a patronage increase factor of 240% (over existing bus services) and 200% (over the 'no Sparks Effect' scenario) was applied to the 'strong Sparks Effect' scenario to account for patronage increases resulting from increased attractiveness of the public transport system.

1.3.2.3 Sparks Effect Case Studies

To effectively analyse the use of the Sparks Effect in the ACIL Tasman analysis, case studies have been undertaken to benchmark findings related to patronage increase resulting from increased attractiveness of the transport service. The case studies selected were undertaken with careful research into the Sparks Effect and thus such assessments are useful in considering the validity of the use of the Sparks Effect for the HNSLR Business Case. The Perth-Mandurah Rail Line has been investigated as it is regarded as one of the most successful implementations of a rail system across the country. The Gold Coast Light Rail system and the Castlereagh Street Light Rail system have been selected as case studies as they are both linear systems that are very similar to the Hobart Northern Suburbs Light Rail System that has been proposed.

The South East Busway in Brisbane has been selected as case study as it is a very successful example of a linear public transport system that operates in a dedicated corridor, much like the proposed HNSLR. It has been investigated as it provides an indication of the potential successes and challenges that may be encountered for the HNSLR.

Perth - Mandurah Rail

The 73km Perth to Mandurah rail line was officially opened on December 23, 2007, and started regular operations the following day. Within six months it was one of the busiest lines on the Transperth network. As a result, it has been regarded as a benchmark for the industry nationally, and is considered one of the primary reasons behind the 57.5% jump in urban passenger rail travel in Perth in just three years, from 35.8m total boardings in 2006/2007 to 56.4m in 2009/2010 (Rail Express, 2010).

When services on the new line started, overnight the Public Transport Authority of Western Australia (PTA) increased the size of its rail network by 70%. It also increased its railcar fleet by 34%, added 62 new feeder bus routes; and increased the size of its potential catchment by about 400,000 people.

The Mandurah Line made commuter travel to and from the southern corridor faster, more efficient and less stressful but it also triggered a major change in travelling patterns.

"The Mandurah connection has enhanced the popularity of rail travel across the whole network," Public Transport Authority (PTA) chief executive at the time Reece Waldock said.

Some rail industry observers have noted the WA Government's claim that rail patronage is two to three times the 16,000 passengers who previously rode by bus along the Mandurah corridor, illustrates that rail perceived to be a more attractive alternative than bus for the motoring public in this type of application (Railway Technical Society of Australasia, 2008).

It has been claimed that the Sparks Effect related to the increased attractiveness of the Mandurah rail line resulting in more than the anticipated patronage levels. It must be noted however that this rail line provided a new public transport service which increased travel time savings as well as being an attractive transit option. These factors would also have contributed to the overall increase in patronage. Therefore, the perceived evidence of the Sparks Effect may not have been as great if this was not the case and must be taken into consideration when determining the overall concept of the Sparks Effect in this instance.

Gold Coast Light Rail

In 2004, a joint Queensland Transport and Gold Coast City Council feasibility study developed plans for a possible light rail or bus rapid transit system. These two possibilities were compared against a number of criteria including passenger capacity, passenger comfort, reliability, safety, sustainability and value for money.

After much detailed planning and community consultation, light rail was selected as the preferred option because:

- it has capacity to move more people than bus rapid transit
- it has a lower environmental impact than bus rapid transit
- it is proven to stimulate economic investment along the route
- the length of light rail vehicles can be increased to service our increasing population
- the Gold Coast community showed strong favour for light rail.

Stage One of the Gold Coast light rail system is a 13km corridor extending from Griffith University in the north to Broadbeach, passing through the activity centres of Southport and Surfers Paradise.

Various studies have been undertaken on the expected patronage of the light rail system once it is developed. A study undertaken by TransLink in 2012 applied an additional 'mode attractiveness factor' for the light rail in order to assess how sensitive the patronage was to specific sensitivities and to incorporate an assumption that passengers would be more attracted to the new mode.

Results indicated that patronage of the light rail system would approximately double the anticipated patronage levels with a mode attractiveness factor of +30%. However, in this assessment, the 'mode attractiveness factor' ended up being of relatively medium significance in comparison with other sensitivities such as headways/boarding time penalties which generated a much higher increase in patronage.

Castlereagh Street Light Rail - Sydney

In February 2005, the City of Sydney released a report on "an Integrated Transport Strategy – Mass Transit for the CBD and Inner Sydney" (Glazebrook and Associates, 2006) which recommended a network of light rail routes to improve the transport capacity, efficiency and amenity of the inner city area. This report drew on a large number of previous studies undertaken for the State Government, including detailed patronage and revenue estimates for a CBD light rail link between Circular Quay and Central Station, undertaken by Booz, Allen & Hamilton in 2004. As a result of this report, the Castlereagh Street alignment was chosen as the preferred alignment for this service.

In 2006, a review was under taken by Glazebrook and Associates into the patronage and revenue for this proposed route. For this review of the initial assessment, scenarios for patronage were used to account for induced travel resulting from increased service attractiveness. It was recognised by Glazebrook and Associates that Booz, Allen & Hamilton adopted for the 2004 study figures of 5% (for peak) and 15% (for off-peak) for induced patronage resulting from increased mode attractiveness. In this instance, these factors were only applied to some sub-markets (Glazebrook and Associates, 2006). In particular, it was not applied to country train and

interchanging bus passengers, arguing that the latter are unlikely to alter their trip behaviour simply because of a change in modes in the city centre, while the latter demand would be suppressed by the interchange penalty.

The 2006 review of these induced patronage factors were considered by Glazebrook and Associates to be a fair measure of the potential increase patronage resulting from increased attractiveness of the public transport mode however it was also noted that this attractiveness factor was only a minor contributor to overall patronage given the relative importance of other factors.

Alternate Public Transport Example: South East Busway Brisbane

The South East Busway, which opened in 2001, is a dedicated 16.5 km long bus corridor and has ten stations between Eight Mile Plains in the south and the Brisbane CBD in the north. It functions as a bus service that is separated from regular vehicular traffic in dedicated busway lanes (Bitzios, 2008). Services from the south, south-east and south-west of Brisbane are mostly orientated towards the busway to make use of the improved travel time and reliability benefits provided by the busway. It functions as the spine of Brisbane's bus network and has seen rapid patronage growth since its introduction.

Assessments have been undertaken related to the overall success of the development. A particular challenge in these review processes has been effectively quantifying all of the benefits associated with the new busway concept, and more widely, public transport as a whole. To overcome this issue, Queensland Transport commissioned a number of studies between 2002 and 2007 to determine what was apparent but could not be quantified; the value for money and long term sustainability provided by the South East Busway. These studies included customer satisfaction surveys in 2002, 2003 and 2004 (Bitzios, 2008).

This survey investigated patronage, which is a key indicator of a mode choice change. This mode choice change can be described as the Sparks Effect for this example. Results of the survey highlight that 40% of respondents stated they now choose to use the busway for trips they previously made by private car, 60% of people who have access to a company car use it less, instead choosing to use the busway for some trips and approximately 50% of respondents stated they have increased their travel on the busway in the last year (Bitzios, 2008).

Overall, the South East Busway has outperformed the rest of Brisbane's bus network with 20% patronage growth from 2005-06 compared to 12% on average growth for all Brisbane Transport Services. This clearly highlights the busway can be a catalyst for delivering higher than average increase in use of public transport (Bitzios, 2008).

These increases in patronage must be considered in the context of other factors, not just mode attractiveness. At the time of the busway's development, the Translink combined ticketing system was introduced, increasing the ease at which people could use public transport as well as improving the overall service. This is a contributing factor to increased patronage in this case and must be considered alongside the 'attractiveness' of the new busway as a patronage generator.

1.3.2.4 Review of the inclusion of TODs in the HNSLR Business Case

Through the case studies outlined above, it is clear that there are many other influences on demand above and beyond the Sparks Effect. These include significantly faster travel speeds, more effective services to Mandurah new feeder bus services, new catchment areas and significant and on-going population growth.

In most Australian public transport CBAs, the value of travel time usually forms the largest single class of benefit. Transits speeds, and hence travel time, is the key driver of this benefit class. It is clear in the no Sparks Effect case, the HNSLR speed is as indicated by Hyder. For the Sparks Effect case, this assumption was relaxed and HNSLR travel time as 10% faster than cars. Ceteris paribus, shorter travel times will be more highly valued and people will switch to HNSLR. That "train premium", or Sparks Effect gives roughly the increase in patronage that was experienced in Perth when the southern busway was converted to trains (ACIL Tasman, 2012). Without this or some other massive service differentiator in favour of HNSLR, the utility models will not generate the mode shift alluded to by the strong Sparks Effect.

There are several practical problems with adapting the strong Sparks Effect to HNSLR. These are:

- Hobart generally does not suffer from road congestion problems in the same way that other Australian capital cities do in the peak hours.
- Much of the peak hour travel is concerned with commuters and non-discretional travel including travel by students.
- Off peak there is very little road congestion implying that there are good point to point motoring transit times.

- HNSLR travel speeds will not increase out of the peak hour, thus negating its key advantage.
- Faster HNSLR line speed will not compensate for walking and waiting time.
- In many cases, cars offer door to door transit, while HNSLR does not, instead requiring transit from door to station and station to destination. Car users are often able to park as close as possible with a view to minimising their walk time. Generally, the walk time from carpark to door is shorter than station to door as stations are inflexible in location whereas carparking is available in various locations near destinations.
- The conclusion that the strong Sparks Effect will be greater in the off-peak is illogical because road speeds will be improved vis-à-vis peak hours.
- Travel speed is only one item in the utility basket which comprises the generalised cost of transit. Other important factors are:
    - the cash cost of driving a car plus parking fees versus the cost of a train fare
    - distance to and from intended destination from car park versus station
    - convenience of travel when ready versus quarter hour HNSLR frequency.

If a strong Sparks Effect does exist, there are a lot of other variables apart from a single service differentiator such as an emotional attachment to trains and the resultant increase in mode attractiveness.

In addition to the above, the idea of perceived benefits must be assessed with consideration to how these benefits have been derived. Improved public transport can generate increased patronage on the improved service through the following:

- people who previously travelled by public transport at a different time or on a different service
- people who previously travelled by another mode
- people undertaking travel that was not previously made (generated trips).

In most strategic traffic models, light (and heavy) rail have faster travel times (due to the lack of congestion effects, higher speeds and longer stopping patterns) than bus services and therefore attract more passengers within the model run. The benefits generated by the first two of these groups of public transport users, can be calculated by comparing the patronage costs of the Base Case and the Project Case.

In addition, the ‘rule-of-a-half’ should be applied to those benefits from generated trips. Generated trips are additional trips that people would not have taken in the base case. The fundamental issue is whether the Sparks Effect creates only generated movements, or causes additional mode shift, or a combination of both. This principle states that the average, or perceived, benefit to generated trips is equal to one-half of the benefit accruing to an existing public transport user (ATC, 2006). According to this rule, if the strong Sparks Effect creates “generated trips” the benefits of additional patronage generated through the perceived Sparks Effect should be valued at half, rather than at a level of full benefit.

In addition, the introduction of an arbitrary multiplier naturally creates distortions across the patronage spectrum and also has an impact on the benefit stream. For example, if HNSLR patronage suddenly doubles, the connection with a compensating adjustment to the other classes of traveller is unclear. The question may be asked; do roads suddenly become less congested as a result of strong sparks, especially in the long term? If so can cars begin to travel faster which would erode the strong Sparks Effect, or are all the strong sparks trips true generated traffic?

In summary, the patronage uptake that ACIL Tasman has utilised can be regarded as very high and optimistic. These high levels of generated patronage are beyond what is generally expected. Inclusion of the strong Sparks Effects artificially inflates the benefit stream and there is limited evidence the effect exists let alone if it can be generated practically by changing the utility and costs of each passenger trip. Unless other attributes are apparent, the presence of having rail based mode on its own cannot be assumed to generate such significant levels of additional patronage.

1.4 Calculation of Benefits

The method of benefit calculation evolved considerably from Stage 1 to Stage 3 of the HNSLR Business Case. In essence, the basic method used is consistent with traditional cost benefit analysis albeit with some customisation. Basically the passenger travel market was segmented by geographic location in terms of origin and destination, and by mode of transport. The benefits were estimated by measuring net consumer surplus for base and project case and this was then compared with the cost estimates to give the NPV, BCR and other parameters under a range of demand scenarios.

1.4.1 Overall Approach

The ACIL Tasman approach in Stage 1 can be summarised as:

> *Our simple analysis involves converting the capital costs of the project into an annuity and then adding them to operating and maintenance costs to provide an annual expenditure figure. This is then compared with revenues based upon a simple model of demand incorporating transference of passenger from existing bus routes to light rail and new passengers within walking distance (400 and 800 metres) of each proposed station using the light rail service. Both cost and revenues are allocated to stations to assess the viability of each station along the route. Track costs are allocated based upon the kilometres of track between one station and the next, and rolling stock costs are allocated across stations based upon demand at each station. (*Stage 1 Report, page viii)

The Stage 1 report summarised the results into a profit and loss type report for each station. There are many ways to present the data and it is customary to aggregate the results into a single category (e.g. all stations combined.) The report was undertaken at a high level to scope out what the boundaries of the HNSLR system might have in a network sense.

This approach was much modified in Stage 3 where the passenger travel market was segmented into two groups in the base case and five groups for the project case. Essentially the project case options are equivalent trip replacements or what is usually described as a "fixed trip" matrix. The introduction of "strong Sparks Effects" results in new generated movements which otherwise do not occur. It is important to note that unlike mode diversion effects where the full benefit of the mode shift is obtained, the "rule of half" applies to generated movements.

Table 3 HNSLR Passenger Types

Base Case	Project Case
Drivers and passengers of private vehicles	Drivers and passengers of private vehicles
Passengers on PT bus services	Passengers on PT bus services
	Walk to Light Rail station and catch a train
	Bus to Light Rail station and catch a train
	Drive to Light Rail station and catch a train

The traditional generation of benefits starts with the development of a transport and traffic model. Generally this is based on the describing the present situation using the four step transport model[3]. Future scenarios are developed on the basis of a combination of business as usual conditions, modifications for land use and population changes, economic development and other factors which provide inputs into the model which is then used for predictive purposes. Essentially the transport model describes the traffic task in terms of trips between different origin and destinations, routes, modes and sometimes classes of travellers (e.g. motorists).

In comparing the project case with the base case in the Stage 3 report, the combined costs of each trip are compared and difference in cost measures the change in consumer surplus. If the project costs are lower than the base case, there is this becomes the benefit stream and represents positive consumer surplus. The bundle of costs which are measured include items like: travel time, waiting time, walking time, vehicle operating costs, parking costs, environmental costs, accident costs etc. The costs are analogous to a disutility function which has modifiers where there are positive utility components. For example, more frequent services or clean trains have

[3] The four step transport model includes – trip generation, trip distribution, model split and trip assignment (ATC, 2006, p. 99 V. 4)

positive benefits to train users. See for example *National Guidelines for Transport System Management in Australia* (ATC, 2006, pp. 48, V. 4).

The ACIL Tasman model is based on these utility functions and for each class of base case passenger trip; they are allocated to a project case trip in one of five segments. As noted, this is based on a series of relatively complex calculations from which the generalised cost for each trip is estimated. AECOM has not reviewed the traffic model or the patronage results for each station and therefore cannot comment on the internal workings of the ACIL Tasman model although the basic methodology is appears to be sound and in line with guidelines.

In conventional models, the benefit stream (consumer surplus) is generally based on a linear or sometimes fixed relationship between the demand level (patronage) multiplied by a unit cost item such as cost per hour, cost per kilometre etc. Basically, this approach has been used by ACIL Tasman using relative standard unit rates based on ATC guidelines. The main difference between the ACIL Tasman approach and the conventional approach is in the shape, derivation, use and interpretation of the demand curve and demand elasticity which is discussed in detail below in **Section 1.5**.

Without the actual patronage estimates, AECOM is unable to replicate the benefit stream but is able to approximate the producer and consumer surplus estimates and intuitively the sensitivity tests such as changes in patronage levels produce results moving in the expected direction.

1.4.2 Benefit Stream Items

Table 4 below provides an overview of the key benefit stream items used in the Stage 3 report for the HNSLR Business Case. Below is a discussion of some of the key points identified during the review.

1.4.2.1 Value of Time and Travel Time Savings

The value of time used in developing the generalised travel costs was $16.80 per person hour. This seems a little high on the given the factored up ATC and RTA unit cost estimates (see **Table 4**). Further,

> *Brighton has the lowest ranking of any LGA in Tasmania in terms of its SEIFA indexes for socio economic disadvantage and socio economic advantage and disadvantage. This means its residents are the most socially and economically disadvantaged in Tasmania. Hobart is the least disadvantaged LGA in Tasmania. Glenorchy ranks between the two, but towards the lower end of the scale* (Stage 1 Report, p11).

The effect of high unit travel time values is that they can sometimes distort the benefits stream by overstating or understating the value of time in the generation of generalised costs of travel. The major problem with the “equity approach” is that it treats all classes of passengers the same. Just as there is information that average incomes of bus users are lower than train users and which are in turn lower than ferry users, logically travellers’ valuation of time will change across the spectrum of users and associated incomes (ATC, 2006, pp. 46-47 V4). There is also strong evidence that motorists tend to have higher average incomes and therefore value their time more highly than do public transport users (ATC, 2006, pp. 46-47 V4). Given that for both the base and project case, private cars will still dominate trips, the relative-door to-door travel times become very significant. By using the same unit costs as for private and public transport, public transport benefits will be overestimated relative to private users. This means a more favourable BCR than should be the case.

Door to door travel time involves a combination of events. For most commuting motorists it is merely a matter of get in the car, drive to a car park and walk from car park to destination. For HNSLR commuters, this is much more complex:

- Walk up passengers will have: walk from home to station, wait at station, in vehicle time, exit station, walk to office.
- For feeder bus users, walk to bus stop, wait for bus, travel in bus, exit bus, wait at station, in vehicle time, exit station, walk to office.
- For feeder cars, drive to car park, wait at station, in vehicle time, exit station, walk to office.

The HNSLR Business Case did not include these additional “waiting penalties” within its travel time calculations. However, given the added complexity of these journeys (compared to car travel), along with the additional time needed to transfer between feeder bus services or cars to the train, it appears unlikely that many car users will switch to rail. This is particularly the case when cars can match HNSLR proposed transit speeds, (40kmh for diesel). As such, mode shift is unlikely to occur. This is what the no Sparks Effect situation represents. In pure demand and supply terms, most people will not switch to an inferior mode (in terms of overall travel time and

complexity of the journey). HNSLR demand take up will be mainly from people currently using more comparable means of transport (such as the bus) or actually not currently travelling.

In essence, transit times are only one component of total travel time. It is also likely that most car drivers can travel more directly to their intended destination and minimise walking time and potentially total travel time compared with HNSLR users. Actual average speed in cars is therefore less important than point-to-point train speeds.

When estimating travel times for the HNSLR Business Case did not include:

- wait time between the bus and train (in feeder bus cases)
- walk time at the termination of directed trips (i.e. predominately walk time to work in the CBD).

Given that the proposed terminus is relatively remote from the downtown area, it is assumed that most travellers have quite a long walk. Even the proposed Mawson Place terminus is outside the recognised core CBD area. Inevitably there are numerous parking opportunities in and around the Hobart CBD and since people will park as close as possible to their actual destination, it would not be unreasonable to assume HNSLR users will have longer walk times at Hobart than typical motorists. Thus the Business Case CBA model appears to significantly underestimate HNSLR users travel time compared with say motorists. This gives the impact of higher than expected patronage and artificially overstating BCR and benefits generally.

Given the above points, it may be that the Business Case has overestimated the mode shift that will occur due to travel time savings, notwithstanding other costs of travel (such as parking costs etc).

1.4.2.2 Petrol Costs

The Business Case CBA model utilises low values for petrol, at $1.20 per litre. While it is true that in October 2012 the price at the bowser has increased significantly to about $1.50 per litre, see for example the RACT Fuel Watch (Royal Automobile Club of Tasmania, 2012), the following comments are offered:

- Taking Glenorchy to Hobart as a representative distance, 9 km, and the estimated fuel consumption, of 0.09 litres per km, the extra cost is about 30 cents per car trip (market prices not economic costs).
- Based on typical car occupancy of 1.3 persons per vehicle, this is about 23 cents per person.
- Based on a travel time cost of $16.80, this represents less than one minute.
- Even very large changes in fuel prices have minimal impacts compared to other more important variables such as travel time.
- Even though rail vehicles can be more efficient per passenger than cars under certain loading conditions, rail vehicles are also affected by increased fuel prices. An example of this is that a diesel tram with 5 passengers will consume more fuel than 2 cars. In reality, a considerable number of trips by the rail vehicles will be operated at a near empty level.

Table 4 Benefit Stream Items

<table>
<tr><th></th><th>Value</th><th>Comments</th><th>Relevant References</th></tr>
<tr><td>Average speed of train</td><td>40 km/h</td><td>
The existing track is used for freight services with a maximum speed of 45 km/h, and an average speed of 25 km/h. The maximum speed of the light rail system is expected to be slightly above 60 km/h, with an average speed for the service between 40km/h and 44km/h.

Comparisons can be made between the anticipated average speed of the HNSLR system and other light rail and tram systems across the world. The examples from Dublin and Berlin have been used as they operate on tracks that are (partially) segregated from road traffic like what is proposed for the HNSLR system. The table below outlines the maximum and average speeds of different systems across the world.

This data highlights the optimistic speed assumptions used in the HNSLR business case.
<table>
<tr><th></th><th>HNSLR</th><th>Gold Coast Light Rail</th><th>Melbourne Metropolitan Tram</th><th>Luas Red Line (Dublin)</th><th>Luas Green Line (Dublin)</th><th>BVG Light Rail (Berlin)</th></tr>
<tr><td>Max</td><td>60</td><td>70</td><td>60*</td><td>70</td><td>70</td><td>70</td></tr>
<tr><td>Average</td><td>40 - 44</td><td>23</td><td>16</td><td>24</td><td>24.5</td><td>19.2</td></tr>
</table>
* Estimate only

Additional comparison can be made against passenger heavy rail in Brisbane. The rail vehicles used in Brisbane have a maximum speed of 100 km/h. In reality, the average speed that these trains are travelling is much lower than this maximum given the distance between stations. The details of the Ferny Grove and Shorncliffe lines have been provided as they are the most similar to HNSLR with respect to distance and stations.
<table>
<tr><th></th><th>kms</th><th>Stations</th><th>km between stations</th><th>Minutes</th><th>Km/h</th></tr>
<tr><td>Ferny Grove</td><td>16.1</td><td>13</td><td>1.2</td><td>30</td><td>32</td></tr>
<tr><td>Shorncliffe</td><td>20.7</td><td>16</td><td>1.3</td><td>33</td><td>38</td></tr>
</table>
</td><td>
Stage 3 Question and Answer Report (Goldlinq, 2012)
(Lucas, 2011)

(Ahern, 2009)

(Berliner Verkehrsbetriebe , 2012)

(Translink, 2012)
</td></tr>
</table>

<table>
<tr><th></th><th>Value</th><th>Comments</th><th>Relevant References</th></tr>
<tr><td>Average speed of cars</td><td>outer: 55 km/h
inner: 38 km/h</td><td>Appears reasonable.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Average speed of buses</td><td>outer: 45 km/h
inner: 32 km/h</td><td>Appears reasonable.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Average speed of walking</td><td>5 km/h</td><td>Appears reasonable.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Valuation of time</td><td>$16.80 per hour</td><td>The methodology described in Appendix A of the Stage 3 report (p. A-4) appears sound however the value of time for public transport users could be argued as overestimated, based on unit rates provided in manuals such as RTA & ATC. For further discussion see Section 1.4.2.1.
<table>
<tr><th></th><th>Car</th><th>Bus</th><th>Train</th></tr>
<tr><td>Average $/person hour</td><td>12.72*</td><td>10.54*</td><td>12.28*</td></tr>
</table>
AECOM investigated the impact of vehicle operating time (VOT) on the generation of Consumer Surplus. Sensitivity tests for VOT plus and minus were conducted assuming a fixed trip matrix with no mode shift. Using a simple model, the results show reduced consumer surplus with higher VOT values and increased consumer surplus with lower VOT compared with the base case. However this is unlikely to fundamentally change the viability of the project.</td><td>Stage 3 Report, page A-10
(RTA, 2009)
(ATC, 2006)
Values indexed to June 2012.</td></tr>
<tr><td>Fuel price</td><td>$1.20</td><td>Lower than the current (2012) average price in Hobart ($1.50) however as noted in the report, the value aligns with the data in the Greater Hobart Travel Survey. This was an appropriate use of the data at the time that the economic analysis was conducted. For further discussion see Section 1.4.2.2</td><td>Stage 3 Report, page A-10
(Royal Automobile Club of Tasmania, 2012)</td></tr>
<tr><td>Fuel consumption</td><td>0.09 L/km</td><td>Appears reasonable.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Ticket price</td><td>$1.50</td><td>Appears reasonable.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Parking costs</td><td>$3.00 per day in Hobart</td><td>Appears reasonable based on the findings of the Park and Ride Community Transport Community Survey (DIER, 2010a) which shows the number of people who pay for parking as:</td><td>Stage 3 Report, page A-10
(DIER, 2010a)</td></tr>
</table>

<table>
<tr><th></th><th>Value</th><th>Comments</th><th>Relevant References</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Carpark Cost</th><th>Number</th><th>Percent</th></tr>
<tr><td>Provided by employer</td><td>146</td><td>41%</td></tr>
<tr><td>Paid</td><td>105</td><td>29%</td></tr>
<tr><td>Free</td><td>106</td><td>30%</td></tr>
<tr><td>Total Responses</td><td>357</td><td></td></tr>
</table>

The weighted average cost of all paid parking is $6; however the weighted average across all survey respondents (including those who do not pay) is $2.
Thus the utilised parking cost seems reasonable, noting that it is the average parking cost across Hobart and not just parking in Hobart CBD.</td><td></td></tr>
<tr><td>Pollution cost</td><td>0.05 Car $/km</td><td>Appears to be from Table C.1 in Appendix C, Volume 3 – 2005 $A (ATC, 2006). This value could have been inflated to 2011 $A but the impact on benefit stream would be negligible.</td><td>Stage 3 Report, page A-10</td></tr>
<tr><td>Road crash cost</td><td>0.083 Car $/km</td><td>Referenced BITRE report (BITRE, 2009, Stage 3 Report, p. A-10) was not available, however the value used can be compared to RTA (1999) which has value of 0.702 $/km at 2012 $A.</td><td>Stage 3 Report, page A-10</td></tr>
</table>

1.5 Cost Parameters

This section provides a review of the cost elements used in the HNSLR Business Case.

1.5.1 Overview

While the focus of this component will be on the HNSLR Business Case Stage 3 report (July 2011), from which the BCR was calculated, AECOM also considered any relevant parameter values used in Stage 1 and Stage 2 of the HNSLR Business Case.

This section will review the high level cost estimates proposed in the ACIL Tasman approach. A commentary will also be given as to the appropriateness of the staging and number of stations. At the outset the basic configuration of the HNSLR system is defined as (Stage 1 Report page 31):

- The HNSLR will have at most 11 stations, being Elizabeth St (optional), or Mawson Place, New Town, Moonah, Derwent Park, Glenorchy, Berriedale, Claremont, Granton, Bridgewater and Brighton.
- There would be one depot for the rolling-stock.
- There would be one park-n-ride facility at or near the terminus of the network, with smaller parking areas at stations en-route.
- There would be two bus interchanges; one at Glenorchy (requiring the existing facility to be moved) and the terminus of the line.
- Trains would run at a flat 15 minute interval from 6am to 7pm weekdays and 8am to 6pm Saturdays, with evening and Sunday services at half-hour intervals.
- There would be boom gates on all 17 roads that cross the line, unless DIER advises on road closures. Only one of these roads has a boom gate at present.

1.5.2 Track and Related Infrastructure Capital Costs

When defining the basic track layout, AECOM have considered the approach undertaken by ACIL Tasman, namely:

> *As part of the early phase of the project, ACIL Tasman spoke with TasRail, who indicated that the track was unsuitable for passenger rail at all (it is too light, and in poor condition), and suggested that the only suitable option would be to replace the track itself. TasRail also notes that replacing the single track with double track may in fact be more suitable, as then signalling can be simpler. According to Hyder, the minimum cost of replacing the single track would be $2,380,000 per km, and replacing it with double-track would be $3,980,000 per km. In this simple analysis, the signalling costs are the same, as $180,000 per km is considered to be a minimum value by Hyder (*Stage 1 Report page 37).

Given the track is approximately 15 km plus crossing loops, this gives a crude track cost of about $36 million. The costs in Stage 3 are very similar to the first cut estimates used in Stage 1.

In addition to the above, a condition assessment of the track was undertaken in 2009 – 2010 which revealed a large backlog in maintenance; to the point where it was determined that it may be cheaper to replace, rather than repair, most of the existing assets. The lack of rail business in the corridor had resulted in a minimum maintenance corridor which is effectively mothballed. The present alignment is over 100 years old and is not designed for operating speeds in the 50 – 60 km per hour range (Stage 2 Report, p. 14).

The high level estimates provided by Hyder in Stage 1 have been qualified as low and based on the other work required to bring it to a safe operational standard, i.e. undertaking a complete rebuild to modern light rail standards. A more refined estimate has been provided by aQuenta in Stage 2 and used in Stage 3 on which the CBA was based, and this estimate included a considerable contingency of $7.2 million, most of which is presumably associated with the track, which is the prime cost item. However, based on the preliminary estimates for the Gold Coast Light Rail project, even these costs are very low. The Gold Coast Rapid Transit (formerly Gold Cost Light Rail) is a 13 km system with an estimated project cost of about $949 million although this includes several major structures (Australian Government, 2012).

In addition, according to the Tourism and Transport Forum (2010), a typical cost range is between $20 and $40 million per kilometre including rolling stock. This would place the overall cost of the HNSLR in the $300 to $600 million range as opposed to the estimate of less than $100million. The purpose of highlighting these other projects is to give a range of typical costs all of which indicate the original costs are very low.

According to the Australian Transport Council (ATC) *National Guidelines for Transport System Management in Australia*, there is allowance for duplicated light rail tack at $10 million to $30 million per kilometre. This is qualified by the statement *"(Which)…includes stops and substations. Cost at the lower end is for ideal locations, with minimal roadworks and service relocation. A cost at the will be at the upper end in complex locations e.g. CBD, where roadworks, high quality 'stops' and service relocations will be required* (ATC, 2006, V4, 43). In addition it is noted that building and construction costs have considerably outstripped CPI increases since 2006 so these costs will be considerably higher in 2011/2012 terms.

Signalling is a highly variable cost and will be greatly impacted by the operating regime and other factors such as interfacing with external traffic management systems. For example, traditional heavy rail uses centralised traffic control, telemetry and in situ signalling. The train controller merely instructs the driver when it is safe to proceed. Modern light rail systems are more bus-like in that the driver has a much greater degree of control of their movements and must be integrated with the road traffic system as well.

In terms of signalling at level crossings, of which there is almost none at present, ACIL Tasman assumed the most basic traffic-light arrangement which is capable of giving light rail vehicles priority. This would cost $150,000 per level crossing. If boom gates are also used (which ACIL Tasman did not assume was the case) the cost rises to $300,000 per level crossing (Stage 1 Report, p. 37). The final specification of the HNSLR system, track configuration and operations will be a key determinant on the type of equipment and level of cost. At this stage the overall concept is still very imprecise.

These costs are very low compared with recent benchmarks. For example, a recent estimate in Queensland to design, install and commission a traditional boom gate system with lights, signalling integrated with the central control system is in the $800,000 to $1 million range. The alternative, road traffic type signals at crossings, is estimated at between $250,000 and $500,000, depending on complexity. It should be noted that with 8 trains per hour, four in each direction, the crossings will be worked much harder than is traditionally the case for many rail projects. Given these headways and the unknown redundancy within the end-to-end cycle time, the ripple effect of even minor delays could be significant especially with only 4 crossing loops en route (AECOM Study Team).

1.5.3 Comparison of Stage 1 and Stage 3 Capital Costs

The costs for Stage 1 are summarised in below:

Table 5 Rolling stock and Mawson Place extension costs – Stage 1 Report

	Low	High
4 vehicles	$14,000,000	$28,000,000
Vehicle storage & maintenance	$8,000,000	$10,000,000
Mawson Place Extension	$2,000,000	$2,000,000
Ticketing/security	$1,000,000	$1,000,000
Other	$1,000,000	$1,000,000
Project Management	$1,000,000	$1,000,000
Total	$27,000,000	$43,000,000

In AECOM's opinion, in addition to these costs, the following must be added:

- a minimum of approximately $36 million for track work
- a minimum of $2.7million for signalling
- about $4 for 4 "stations" with crossing loops
- about $1.2m for 6 platforms
- about $2.55m for 17 level crossings at $150,000 each giving an approximate total of about $73.45 million to $89.45 million depending on the rollingstock configuration. A midpoint calculation is about $81 million.

In comparison the Stage 3 costs are summarised below.

Table 6 Rolling stock and Mawson Place extension costs – Stage 3 Report

	Diesel	Electric
4 vehicles*	$25,000,000	$25,000,000
Vehicle storage & maintenance	$3,100,000	$3,100,000
Mawson Place Extension	$400,000	$400,000
Project Management	$3,889,100	$5,005,100
Signalling	$5,000,000	$5,000,000
Track	$33,544,000	$33,544,000
Platforms	$900,000	$900,000
Platform with loops	$2,000,000	$2,000,000
Level crossing - no boom gates	$3,420,000	$3,420,000
Park n ride facility	$1,800,000	$1,800,000
Electrification		$11500000
Other	$518,662	$558,162
Total	$79,571,762	$92,227,262

* Cost includes spare vehicle

These costs are relatively similar to the original although individual cost components have changed, in some cases considerably. The most noticeable are:

- the cost of the workshops, $8m to $3m
- signalling, $2.7m to $5m
- Stage 1 has four vehicles ranging in price from $14m to $28m, Stage 3 has five vehicles at $5m each
- stations and platforms, $5m to $2.9m.

These costs are considered a very low estimate and even operationally, the configuration of the system may not be feasible.

It must be noted that there are no boom gates at any of the 17 level crossings, each of which have 8 trains per hour during daylight hours. This is a significant cost that has not been included in the Business Case assessment. Replacing the aQuenta estimate for level crossings with recent estimates for similar work in Queensland of about $900,000 per level crossing fitted with boom gates and other standard fixtures would increase overall HNSLR Business Case costs by over $12 million. In addition to this, the cost for the proposed park-n-ride facility was $1.35million, which is notably less expensive than the current Springfield Lakes 300 bay park and ride facility which is valued at approximately $30 million.

1.5.4 Operating Costs - Maintenance

The Stage 1 report highlighted that in terms of maintaining the track, Hyder suggested that the existing track would cost $100,000 per km initially, rising by $10,000 per km every year as it is further worn down. If new track is laid, it is likely to incur no maintenance costs for five years, and then attract a similar maintenance schedule [to part worn track]. ACIL Tasman assumed costs of $100,000 per km if no new track is laid, and zero if new track is laid. This is thus likely to under-estimate track maintenance costs.

The maintenance estimate of $100, 000 per route km per year is considered high for pure track maintenance in Australia. It is likely that although light passenger loads impose little wear and tear on modern rail, the costs associated with maintaining high use items, for example, 17 sets of boom gates, may be the reason for the cost being this high.

1.5.5 Park and Ride Facility

For the park and ride facility, ACIL Tasman used DIER figures of $150 per square metre for construction costs, which gave a total cost for 300 bays of $1,350,000. ACIL Tasman did not assume any costs for surrounding roads and bridges along the track, nor any costs associated with earthworks on the track. Finally, they did not assume any depot or head-office costs (Stage 1 Report, p. 37). It could therefore be considered that ACIL Tasman has thus adopted a very conservative cost profile.

Recently completed estimates for the 300 bay park and ride facility for Springfield Lakes station in Queensland place this cost at approximately $30 million, however this should be considered an extreme example. The ATC 2006 Guidelines estimate the cost of an at grade commuter car park at $10,000 per space (ATC, 2006, pp. 43, volume 4). These costs were highlighted in Stage 1 but appear not to be included in Stage 3.

1.5.6 Rolling Stock

1.5.6.1 Capital Costs

The HNSLR proposal calls for four vehicles of about 200 passenger capacity either with diesel, electric or battery power. The rollingstock cost estimates in the Stage 1 Report ranged from $14 to $28 million (Stage 1 Report, p. 36). This was revised in the Stage 3 Report to about $5million per vehicle (Stage 3 Report, p. 21). The estimate of $5 to $7 million per unit seems reasonable based on corroborated information such as the 2010 article in The Age regarding tram costs in Dandenong which states that "*Each tram will cost $6 million - about $1 million more than for comparable orders for trams in other cities"* (Lucas, 2010). With respect to costings as well as capacity, the electric units proposed for HNSLR would be similar to the new Bombardier units built for Melbourne.

1.5.6.2 Operating Costs - Maintenance

With respect to the maintenance of rolling stock, in a larger network there is generally an allowance made for an additional 5% (as a minimum) of the number of vehicles kept as spares at any given point in time. Operationally and practically speaking, the number of vehicles proposed for the HNSLR network (five vehicles) prevents economies of scale for spare vehicles being created. In the HNSLR context, a minimum 5% allowance for spares effectively means one physical vehicle which, in reality, equates to a 20% spares allowance. This allowance is very high and an obvious result of not reaching the economies of scale. Given the long hours these vehicles will operate, there is no possibility for daylight maintenance; therefore all vehicles will have to be maintained at more expensive night rates, effectively increasing overall operating costs.

1.5.7 Summary of Findings

Overall, based on evidence from other project examples, the cost parameters utilised by ACIL Tasman in the HNSLR Business Case are low. In reality, we believe that these costs would be much higher, effectively increasing the overall cost of the project by a substantial amount.

1.6 Consumer and Producer Surplus

Models of consumer choice based on Consumer Surplus and Producer Surplus underpin the foundations of Welfare Economics, and the assessment of a cost benefit analysis. This section sets out the findings of the review which assessed how successful the model utilised in the Business Case was in reflecting the simulated operation and commercial situation and how this relates to future benefit streams and their alignment with IA's expectations.

1.6.1 Consumer Surplus

1.6.1.1 Conventional Approach

The conventional approach to estimating consumer surplus uses a simplified straight line approach to the demand curve with point elasticity. In the absence of data depicting the true shape of a demand curve, this approach is considered a flawed approximation of the real situation. However, it is computationally simple to measure the area under the [straight] demand curve. For infrastructure projects, there is considerable difficulty in estimating unknown future levels of demand and the shape of the demand curve until they actually happen.

The problem with the straight line approach is that elasticity changes along each section of the demand curve so the midpoint based on the average consumer underpins the point estimate of demand. Unless the forecast demand is exactly correct, the consumer surplus estimate will be wrong. In some cases the demand curve is straight and the forecasts are realised thus the estimate of consumer surplus will be close to correct.

1.6.1.2 HNSLR Business Case Approach

ACIL Tasman has used an alternative approach based on considerable research and revealed preference data to underpin their estimation of the demand curve. That is, the elasticity is held constant across the demand curve so therefore the shape of the demand curve changes from a straight line to a concave shape. Integral calculus is used to measure the areas under the demand curve which represents consumer surplus. The theoretical argument is:

> *…that one cannot accurately estimate elasticity and consumer surplus jointly using a point estimate of demand for a representative consumer and extrapolating for the population as a whole* (Sagerer & Wills-Johnson, 2012).

The approach to estimating demand curves is based on consumers selecting the least cost method of travel. ACIL Tasman follows the conventional approach of bundling each element in a logistic chain into a complete package representing a door to door movement. The derived cost contains monetary items such as fares, vehicle costs, parking costs, travel time, waiting and walking time, service quality differentiators such as service frequency, cleanliness of facilities and vehicles, comfort, security and safety, convenience etc. These directly impact on consumers mode choices. There are also other social costs which many consumers are unaware of such as the environmental and pollutant impact associated with different trips type and modes of transport. From this point, ACIL Tasman generated thousands of scatter plots each representing a demand point based on the cost of a transport package with variations in the value of individual components to estimate changes in behaviour at each price point. Regression analysis was used to estimate the shape of the demand curve however they found an iso-elastic curve gave the best fit. That is, the elasticity is held constant across the demand curve so therefore the shape of the demand curve changes from a straight line to a concave shape.

1.6.1.3 Review of the use of Consumer Surplus Approach in the HNSLR Business Case

The approach utilised by ACIL Tasman in the HNSLR Business Case, while not necessarily the approach normally taken in Australian CBAs, is sound, and based on appropriate economic theory.

However the approach does create difficulties in terms of separating out the benefits attributed to the various components of the benefit stream such as travel time savings and vehicle operating costs which are part of the IA submission template. This may need additional consideration should DIER wish to submit a comprehensive IA submission, and to complete the relevant sensitivity tests (see **Section 1.8**).

Although AECOM has been unable to review the trip matrix developed by ACIL Tasman, a simplified version has been developed from which Consumer Surplus can be estimated at a high level for a basic comparison with ACIL Tasman's estimate.

The following simplifying assumptions were made or replicated from the original Business case:

- There are two terminals – Hobart and Glenorchy as a proxy for all non CBD locations. Some stations are closer to Hobart, some further out so Glenorchy is a satisfactory midpoint.
- About 70% of the morning trips are to the CBD and 30% in the opposite direction.
- Weekly patronage data was sourced from the Stage 3 Report, Table ES2.
- Two scenarios were tested:
    - Strong Sparks Effect.
    - No Sparks Effect.
- Value of time was $16.8 per hour for all classes of transport users.
- Motor vehicle operating costs, externalities and parking costs were based on ATC guidelines and adjusted for inflation to June Quarter 2012 prices.
- Cars average 1.3 occupants.
- HNSLR average 20 passengers each.
- Average daily trips are 1/7 of the weekly total and 365 days per year is the annualising factor.
- Four train services per hour in each direction over 16 hours per day.
- The Spark Effect model is modified based on 10kmh speed advantage over cars.
- There is no adjustment in the base case to allow for increasing traffic congestion over time.

The simplified model gives results which approximate those developed by ACIL Tasman. The main reason for differences relates to AECOM's assumptions and lack of hard origin-destination data which was used in the original. The results for the No Sparks scenario are shown below in **Table 7**. The simple model lacks the sophistication of the original which used the influence of TODs and other modifying factors but the results are close enough to basically corroborate ACIL Tasman's approach.

Table 7 Consumer Surplus Estimate for No Sparks Case ($million pa)

	Original	AECOM	Variance
Year 1	2.41	2.29	5%
Year 5	2.79	2.37	17%
Year 10	3.02	3.59	-16%
Year 20	3.21	3.81	-16%
Year 30	3.39	4.02	-16%

Note: Original is sourced from Table ES2 in Stage 3 Report

The results for the Strong Sparks scenario are shown in **Table 8** below. AECOM's simple model estimates are quite close to ACIL Tasman's except for at the year 5 scenario. Again, the results are close enough to basically corroborate ACIL Tasman's approach.

Table 8 Consumer Surplus Estimate for Strong Sparks Case ($million pa)

	Original	AECOM	Variance
Year 1	11.12	10.20	9%
Year 5	12.72	10.49	21%
Year 10	13.47	12.53	7%
Year 20	14.30	13.31	7%
Year 30	15.08	14.03	7%

Note: Original is sourced from Table ES2 in Stage 3 Report

The important point to note is that in Cost Benefit Analyses, consumer surplus plus producer surplus is the true measure of the benefit stream. But there are some complications where there is a loss of producer surplus, which is the case for HNSLR

Almost all public transport is priced below its true full cost recovery point. From the available information, this is the case for HNSLR. Thus rather than enjoying positive consumer surplus, instead this becomes a negative element on the benefit side of the Cost Benefit Analysis. This is completely normal and is to be expected. HNSLR is no different to most public transport systems the world over. This issue is dealt with in greater detail below.

1.6.2 Producer Surplus

1.6.2.1 HNSLR Business Case Approach

The HNSLR Business Case used a conventional approach in estimating producer surplus. In general terms, producer surplus is the area under the supply curve at the price point. Because of the relatively high infrastructure levels and cost relative to variable cost in public transport, the supply curve is normally shown as flat, i.e. essentially it is fixed in the short to medium term. In this case, there is a loss of consumer surplus because the sell price of a fare is below the average costs to provide that fare. This is shown in the figure below by the price point Pc compared with Ps. The loss to "producers" is measured by the pale turquoise area.

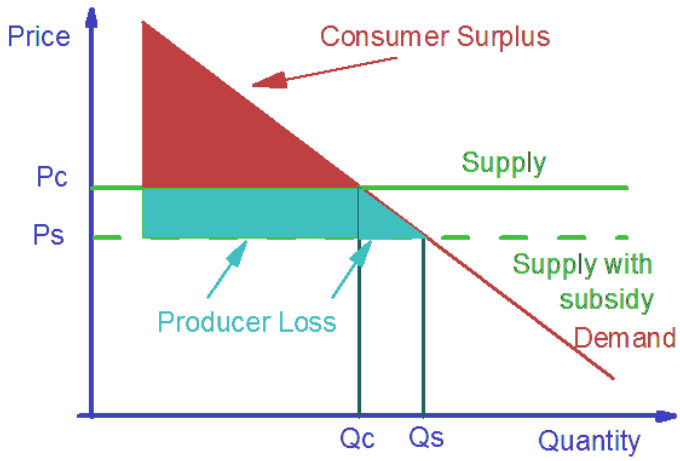


Figure 2 Estimate of Producer Loss

Pc is the price in a competitive market at quantity Qc which recovers costs.
Ps is the subsidised market price at the Qs supply level.

The ACIL Tasman method parallels an annual profit and loss statement in that all costs are calculated and then the cashflows assigned to an annuity over the life of the appraisal based on a real 7% discount rate. This is somewhat unconventional since the normal practice is to expense all capital items in year 0. Although costs change over time, e.g. maintenance increases as assets get older, by assembling all costs and then placing them in an annuity, the same present value (PV) estimate is arrived at. In defence of ACIL Tasman, this approach is reasonable given the service will operate basically the same way unchanged over the life of the appraisal e.g. four services and hour in each direction, etc.

Taking this bottom line costing approach, ACIL Tasman have estimated typical fare box revenue[4] for each year and deducted this from the annuity. This represents the subsidy required to break even, and more importantly, to remain operational. The actual subsidy represents the loss of producer surplus. External to the estimate of producer and consumer surplus, the fare subsidy has been modified by a 20% multiplier. This modified subsidy is negative and is shown as a negative item on the benefit side of the CBA.

1.6.3 Benefit Cost Ratio

In the no Sparks Effect case, the subsidy is about 50% to 200% higher than the estimated consumer surplus. This means there is an overall **negative** benefit stream. Inevitably this results in a negative NPV when costs are deducted and a very low BCR. Clearly if this represents the real world situation, the society is made worse off with the project than if nothing had been done at all.

[4] Fare box revenue represents cash receipts from ticket sales made by a service provider.

In the case of the Strong Sparks, the revenue stream is about 3.4 times higher than for the No Sparks. Given that costs are relatively fixed[5], and revenue is a linear function of patronage, the Strong Sparks operating subsidy (the producer surplus loss) is relatively small especially compared with the No Sparks case and indeed compared with the modified revenue stream. This means:

- there is little producer loss to reduce consumer surplus and therefore the benefit stream
- there is a positive benefit stream and given the cost levels, this implies a modest positive NPV and BCR for the diesel option. The electric option fails to break even.

The caveat to the above conclusions is a reality check:

- It assumes the Strong Sparks Effect exists and is powerful enough to boost patronage by 3.4 times the conservative estimate.
- It assumes relatively high public transport use when there is limited access to the northern end of the CBD from the HNSLR perspective.
- It ignores the true track rebuild/realignment costs which are probably closer to $10m per km including demolition and removal of existing equipment. The additional high cost of boom gates, fencing and other expenses will be unavoidable.
- Higher speeds also imply boom gates are down more than would be the case for low speed operation meaning added delays and inconvenience to motorists, cyclists and pedestrians wishing to cross the line. These costs have not been factored in.
- When these adjustments are accounted for, inevitably the project will not have a positive NPV or favourable BCR.

1.6.3.1 AECOM Estimate of the NPV and BCR

Given that AECOM's estimates for net consumer surplus are not dissimilar to HNSLR Business Case results (Stage 3 Report, Table ES1), it follows that the estimates for BCR and NPV are relatively similar. For simplicity a comparison of the No Sparks and Strong Sparks scenarios have been estimated at the 7% real discount rate. AECOMs estimates for consumer and producer surplus are based on Year 1, 5 10, 20 and 30 tests with intermediate years linearly interpolated.

An excerpt from the original table is shown in **Table 9**.

Table 9 HNSLR Business Case Results (7% Discount Rate)

	Strong Sparks		No Sparks	
	BCR	NPV ($M)	BCR	NPV ($M)
OOSM1	1.10	14.50	0.00	-191.50
OOSM2	0.95	-7.40	0.00	-213.80

Source: Stage 3 Report, Table ES1

The AECOM estimate is shown in **Table 10** below.

Table 10 AECOM Estimate (7% Discount Rate)

	Strong Sparks		No Sparks	
	BCR	NPV ($M)	BCR	NPV ($M)
OOSM1	0.93	-10.50	0.00	-193.67
OOSM2	0.81	-32.44	0.00	-216.04

Overall the AECOM estimate is lower for the Strong Sparks effect and only slightly lower for the No Sparks Case. However, the overall conclusions remain the same, thus corroborating the ACIL Tasman approach and findings.

[5] In general terms, Business Case have added extra rolling stock and commensurate operating costs but there is no budget for a complete track rebuild for "high" speed operation.

1.7 Non-Monetised Costs and Benefits

Non-monetised costs and benefits are generally items which cannot be readily valued in monetary terms. Attempts to value these costs and benefits can involve expensive processes that yield results with very wide margins of error. Explicit recognition is thus given to non-monetised costs and benefits by describing them in qualitative terms, and where possible, quantifying them using natural units (ATC, 2006, pp. 51, V3).

The purpose of this section is to describe some of the impacts beyond the strictly microeconomic focus of conventional CBA, that is, the non-monetised costs and benefits of the HNSLR. This does not mean these impacts are irrelevant or insignificant but rather they are often beyond the scope of conventional CBA.

1.7.1 Use of non-monetised costs and benefits in HNSLR Business Case

There were a number of costs and benefits not included within the CBA in the HNSLR Business Case. The Stage 3 Report groups these costs and benefits into the category of "non-monetised" costs and benefits.

The table below replicates the summary tables in the Stage 3 Report.

Table 11 Summary of non-monetised costs and benefits from Stage 3 Report

Cost	Description	Rating
Benefits – Table ES3		
Line closures during construction	The line, which is lightly used, would need to close during construction.	Low
Road congestion effects from boom gates at intersections	There are 12 intersections between the road system and rail, and boom gate closures could adversely affect traffic as trains pass.	High
Amenity at Mawson Place	The rail may detract from heritage value, in Mawson Place, particularly if overhead wires are used.	Low
Safety at Mawson Place	Pedestrians and the train would mix in Mawson Place	Low
Costs – Table ES4		
Social costs of congestion	The CBA includes only the private costs, fuel savings and pollution reduction. BITRE (2007) also show savings to business. The Business Case quantified these, but the results were not believed to be sufficiently robust to be use in a cost benefit analysis.	Medium
Social exclusion	People are able to access services and the wider community more easily, and do not need to incur the financial burdens associated with owning a car.	Medium
Creation of TODs	There are numerous development opportunities associated with the creation of TOD precincts which improve the amenity of the region and extend beyond travel time savings.	Medium
Environmental pollution	The societal cost of environmental pollution was captured within the CBA, utilising the pollution unit rate (see**, Section 4.2**).	Low
Tourism	We show how the NSLRS might benefit tourism.	Low

Source: Table ES3 and Table ES4, Stage 3 Report

The appropriateness of these identified non-monetised costs and benefits, can be assessed against the principles of the strategic merit test (SMT) as set out by the ATC (2006, p. 15 V.3). In this section, the concept of the SMT is applied in the sense of determining whether the identified non-monetised costs and benefits align, or detract from, the wider aspirations of the Greater Hobart community, and the objectives, policies and strategies of the region.

1.7.1.1 IA guideline requirements

The IA guidelines require the inclusion of non-monetised costs and benefits and highlight that these costs and benefits are of interest to IA, even if they cannot be quantified. The following categories are the identified by IA as non-monetised benefits/costs of a proposal, based on the fact that they are not generally able to be quantified (Infrastructure Australia, 2012, p. 21). The IA guidelines do not provide guidance as to what is meant by these categories.

- visual / landscape
- social amenity, e.g. parklands
- social cohesion
- heritage or cultural impacts.

Importantly, IA indicate that the categories identified above are for guidance only and the additional non-monetised costs and benefits identified in the Business Case are still of relevance to the project and may be considered (Infrastructure Australia, 2012, p. 21).

The IA submission requires that the identified non-monetised costs and benefits to be rated in size using a 7-point scale from highly beneficial to highly detrimental. These ratings can be aligned with the ratings used in the Stage 3 Report (see **Table 12**).

Table 12 IA rating levels for non-monetised costs and benefits

Rating Level	Description
Highly beneficial	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
Moderately beneficial	Moderate positive impact, possibly of short, medium or longer-term duration. Positive outcome may be in terms of new opportunities or outcomes which enhance or improve on current conditions.
Slightly beneficial	Minimal positive impact, possibly only lasting over the short-term. May be confined to a limited area.
Neutral	Neutral—no discernible or predicted positive or negative impact.
Slightly detrimental	Minimal negative impact, probably short-term, able to be managed or mitigated, and will not cause substantial detrimental effects. May be confined to a small area.
Moderately detrimental	Moderate negative impact. Impacts may be short, medium or long-term and impacts will most likely respond to management actions.
Highly detrimental	Major negative impacts with serious, long-term and possibly irreversible effects leading to serious damage, degradation or deterioration of the physical, economic or social environment. Requires a major re-scope of concept, design, location, justification, or requires major commitment to extensive management strategies to mitigate the effect.

Source: (Infrastructure Australia, 2012, p. 21).

1.7.2 Review of the non-monetised costs and benefits in the HNSLR Business Case

As noted by IA, the categories they identify (outlined above) are for guidance only and the additional non-monetised costs and benefits identified in the Business Case are still of relevance to the project and may be considered (Infrastructure Australia, 2012, p. 21). This includes costs and benefits that are “difficult to quantify” due to the cost/complexity involved in doing so (see **Section** Error! Reference source not found.). Given the above, all of the non-monetised costs and benefits identified in the HNSLR Business Case align with the IA guidelines.

Table 13 below sets out the non-monetised costs and benefits identified in the Stage 3 Report and provide some general commentary about the reasonableness of their inclusion in the HNSLR Business Case (Infrastructure Australia, 2012). We also provide a rating to align with the 7-point scale IA rating system.

Table 13 Non-monetised costs and benefits

Utilised in the Business Case	Business Case Rating / IA Rating	Comments	Reference
Costs			
Line closures during construction	Low / Slightly detrimental	Although this impact could in theory be given a monetary value, it is reasonable to include it as a non-monetised cost as the time/cost to collate the necessary data would be unreasonable given the cost's impact on the BCR would likely be near negligible. In addition, depending on timing, it is possible all freight terminal activity will have relocate to the new Brighton terminal in which case this will not be a problem. Consideration should also be given to the impact of road closures during construction The installation of modular level crossings and associated safety equipment such as boom gates, etc. will necessitate at least partial closures of roads along the route plus the added cost of safety supervision, etc.	Stage 3 Report, p. 22
Road congestion effects from boom gates at intersections	High / Moderately detrimental	As acknowledged in the Business Case, given that there are 17 level crossings along the route, the impact on existing traffic flows could be very high, and could impact significantly on the flow of traffic along the route. However, to quantifying the cost would require the development of a network traffic model, and the cost of this would likely be prohibitive. As such, the Business Case has included this cost within the non-monetised costs section. Some impact could be mitigated by redesigning intersections and layouts. However, this additional cost has not been included within the cost assumptions.	Stage 3 Report, p. 22-23
Amenity at Mawson Place	Low / Slightly detrimental	The impact on amenity at Mawson Place is important to consider, given the adverse impacts in providing a light rail system in a heritage location frequented by pedestrians. Noise and pollutant impacts can be expected if diesel power is used. However, appropriate design could mitigate some of this impact and overall the business case rating of low appears reasonable.	Stage 3 Report, p. 22-23
Safety at Mawson Place	Low/ Slightly detrimental	Some quantification of the cost to pedestrians of accidents at the crossing could be included however the cost of determining this value would be too expensive to produce a reasonable estimate, as such inclusion of this cost as non-monetised is appropriate.	Stage 3 Report, p. 23
Benefits			
Social costs of congestion	Medium/ Moderately beneficial	As outlined in the Stage 3 Report, the quantification of the cost to businesses from congestion was not robust enough for inclusion in the CBA, and such it is reasonable for the benefit to be included as a non-monetised benefit, to ensure the role of HNSLR in reducing congestion costs for businesses is acknowledged.	Stage 3 Report, p. 11
Social exclusion	Medium / Moderately beneficial	It is well documented that public transport is an important contributor to the wellbeing of individuals and communities (Hurni, 2006). It is a means by which people can access work, education, shopping, health services, as well as social,	Stage 3 Report, p. 12

Utilised in the Business Case	Business Case Rating / IA Rating	Comments	Reference
		cultural and recreational activities and keep connected with family and friends. The provision of light rail, and the feeder bus systems, may lead to improved access for socially disadvantaged residents. However it may not be that expenditure on a light rail service would be the most effective way of improving public transport access for socially disadvantaged residents in the northern suburbs. This is also noted in a footnote within Report 3 which acknowledges that social disadvantage could also be achieved through, …*similar high quality services that did not necessarily involve rail (Sparks Effects notwithstanding) but involved a good feeder-bus system; it is the quality, rather than the mode, which matters in the reduction of social disadvantage*.	
Creation of TODs	Medium / Highly Beneficial	The inclusion of TODs within the CBA has already been covered elsewhere in this report with regard to its impact on HNSLR patronage numbers (**Section 1.3.1**). However, in addition the fact that HNSLR may also support the creation of TODs is also of relevance, such as by supporting urban consolidation, increasing walking and public transport use and reducing the dependence on cars. However, as covered in depth in Report 3, while HNSLR would contribute to the ability for TODs to be created and sustained within Hobart, there are many other factors that would need to align for the TOD developments to occur, and provision of light rail in itself will not "create" TODs. This is discussed in detail in **Section 1.3.1**.	Stage 3 Report, p. 14
Environmental pollution	Low/ Slightly beneficial	The societal cost of environmental pollution was captured within the CBA, utilising the pollution unit rate (see Section 4.2), however this section attempts to highlight the community health benefits of reducing car usage. This is a reasonable inclusion; however the impact would likely be very low, given that much of the anticipated light rail patronage would be mode shift from buses.	Stage 3 Report, p. 17
Tourism	Low/ Moderately beneficial	The assertion that light rail would provide more convenient public transport options for tourists to Greater Hobart is reasonable assertion. However, the value of this benefit is "difficult to quantify" and is therefore included within the non-monetised benefits component.	Stage 3 Report, p. 18

1.8 Sensitivity Testing

Sensitivity testing in cost benefit analysis is a key element of risk assessment. According to the Infrastructure Australia (IA) guidelines, there are four sources of uncertainty surrounding a proposal (Infrastructure Australia, 2012):

- capital costs
- construction duration and therefore opening date
- operating (including maintenance) costs
- under and over estimation of the benefits (typically demand for the service).

In addition, other sensitivities must be investigated including:

- changes in global oil prices
- fluctuations in carbon prices
- different population growth/decline scenarios.

The guidelines require that a risk assessment be undertaken to estimate the typical variations around these inputs. This constitutes the key elements within the sensitivity testing component of a submission to IA. The IA guidelines for sensitivity testing requirements are outlined in **Table 14**.

Table 14 IA Guideline Sensitivity Test Categories

IA Sensitivity Testing Requirements	Indicator
Capital Costs Up 20%	Capital Expenditure
Capital Costs Down 20%	
VOT (Travel Time Benefit) Up 40%	Travel Time
VOT (Travel Time Benefit) Down 40%	
VOC Savings Up 20%	Vehicle Operating Costs
VOC Savings Down 20%	
Accident Benefit Up 20%	Accident Incidences
Accident Benefit Down 20%	
Operating Costs Up 20%	Operating Costs
Operating Costs Down 20%	
Worst Case = Cost + 30%, Benefit - 30%	Multiple Conditions
PA Trip Growth rate flat 2% pa after 2011	Patronage
Construction and Operational Delay 1 year	Timing Delays
Construction and Operational Delay 5 year	

The HNSLR Business Case prepared by ACIL Tasman, fails to report the sensitivity testing in line with IA requirements. The primary reported results of sensitivity testing by ACIL Tasman focus purely on alternate patronage scenarios, rather than including other variables such as capital costs, travel time, accident incidents and operational costs.

It is acknowledged that formal sensitivity testing was reportedly undertaken by ACIL Tasman; however these results were not explicitly reported in the Business Case, nor was the method of undertaking the sensitivity testing in line with IA guidelines. ACIL Tasman undertook, but did not report, sensitivity testing adjusting the following indicators:

- estimation of benefits
- population growth forecasts
- estimation of capital costs (not operating costs).

This sensitivity testing was undertaken through generating thousands of possible scenarios related to costs, benefits and population. The histograms that are included in the Business Case depict normal distribution characteristics showing the relationship between population growth and the benefit cost ratio generated. While this is a fair sensitivity test, it does not align with IA reporting requirements.

In addition to the histograms included within the Business Case, the sensitivity categories that have been used for reporting purposes by ACIL Tasman for the sensitivity analysis are outlined in **Table 15** below.

Table 15 Reported Sensitivity Assessment Alignment with IA Guidelines

Utilised	Alignment with guidelines	Commentary
Strong sparks case	✓	Base Case
90% of strong sparks	X	
80% of strong sparks	✓	Trip decline by 20% (maximum potential trips)
70% of strong sparks	X	
170% of no sparks	X	
160% of no sparks	X	
150% of no sparks	X	
140% of no sparks	X	
130% of no sparks	X	
120% of no sparks	X	
110% of no sparks	X	
No sparks case	✓	Base Case 2

To comply with IA sensitivity testing and reporting guidelines, the results of the additional scenarios undertaken by ACIL Tasman, as indicated above, must be reported. Additional scenarios in line with the IA guidelines must also be tested and reported to highlight the effects of other conditions for each indicator should be reported in the Business Case.

1.9 Assessment of the Optimal Length of the HNSLR Line

This section provides a review of the approach taken to determine the optimal length of the HNSLR line.

1.9.1 HNSLR Business Case Approach

The HNSLR Business Case approach is most clearly mapped out in its Stage 1 Report which considered a network of 10 stations plus Hobart CBD. In this report, the assessment was based on high level first cut costs and a simplified revenue model. The revenue model was based on a simplified trip generation model based on a 15% capture rate for residents within 800 metres of a station plus some diversions from the bus service. In a way, each non-CBD station was assessed along conventional 'Profit and Loss Statement' lines in terms of reporting only the net revenue (which is gross revenue minus assigned costs) per station. This is shown in Table ES1 of the Stage 1 Report and part of this is also replicated below for the Worst Case Scenario.

Table 16 Annual net revenues per station ($'000) – Worst Case Demand Scenario

	Low Rolling stock Cost				High Rolling stock Cost			
	Signalling only cost per km (track perfect)	Realistic most basic option (signal plus minor track upgrade)	New single track plus signalling	New double track plus signalling	Signalling only cost per km (track perfect)	Realistic most basic option (signal plus minor track upgrade)	New single track plus signalling	New double track plus signalling
New Town	-$1,000	-$1,158	-$1,380	-$1,949	-$1,098	-$1,256	-$1,478	-$2,047
Moonah	-$427	-$475	-$542	-$734	-$590	-$638	-$705	-$897
Derwent Park	-$355	-$385	-$426	-$546	-$538	-$568	-$610	-$729
Glenorchy	$11	-$42	-$117	-$266	-$646	-$699	-$774	-$923
Berriedale	-$262	-$350	-$472	-$824	-$372	-$460	-$583	-$934
Claremont	-$438	-$510	-$611	-$836	-$516	-$588	-$689	-$914
Granton	-$837	-$1,017	-$1,269	-$1,927	-$886	-$1,066	-$1,318	-$1,975
Bridgewater	-$909	-$970	-$1,055	-$1,300	-$1,762	-$1,823	-$1,909	-$2,153
Brighton	-$1,081	-$1,282	-$1,564	-$2,369	-$1,308	-$1,509	-$1,790	-$2,595

These values appear to be on an annuity based on the generated NPV over the 30 year life of the appraisal period.

Turning firstly to the costs, these are based:

- on low cost or high cost rolling stock
- on various grades of infrastructure ranging from very basis to reasonably good standard
- on simple stations, signalling and infrastructure.

The costs are internal to the model, thus we are unable to confirm the exact cost elements. It is noted that the terminal station has additional costs factored in and that when a decremental approach to the network is planned, these additional terminal costs transfer to the next station back towards Hobart. Below outlines the costs per boarding for the worst case demand scenario.

Table 17 Cost per boarding, Worst Case Demand Scenario

	Low Rolling stock cost				High Rolling stock cost			
	Signalling only cost per km (track perfect)	Realistic most basic option (signal plus minor track upgrade)	New single track plus signalling	New double track plus signalling	Signalling only cost per km (track perfect)	Realistic most basic option (signal plus minor track upgrade)	New single track plus signalling	New double track plus signalling
New Town	$46.31	$53.26	$62.96	$87.91	$50.62	$57.56	$67.26	$92.21
Moonah	$5.08	$5.37	$5.77	$6.93	$6.06	$6.35	$6.76	$7.92
Derwent Park	$4.33	$4.48	$4.70	$5.31	$5.27	$5.43	$5.64	$6.26
Glenorchy	$2.49	$2.54	$2.61	$2.74	$3.08	$3.13	$3.20	$3.33
Berriedale	$5.46	$6.06	$6.88	$9.25	$6.21	$6.80	$7.63	$9.99
Claremont	$10.91	$12.10	$13.76	$17.47	$12.19	$13.38	$15.04	$18.74
Granton	$95.55	$115.35	$143.01	$215.12	$100.88	$120.68	$148.35	$220.45
Bridgewater	$8.01	$8.30	$8.70	$9.86	$12.05	$12.34	$12.74	$13.90
Brighton	$63.04	$73.96	$89.23	$132.92	$75.33	$86.26	$101.52	$145.22

This decremental approach formed the options based on 10 stations in Stage 1 and in subsequent stages the HNSLR was trimmed to 7 stations terminating at Claremont in Stage 3. The conclusion reached in the Business Case Stage 1 was that the extra stations beyond Claremont added considerable extra infrastructure and operating costs without commensurate increases in patronage to pay for these costs. These outer stations were not considered in Stage 3. One of the major challenges in planning a network is matching demand and supply and balancing revenues (benefits) and costs. A major complication is that costs can be apportioned on a user pays basis but frequently a zonal fare system operates, creating potential distortions as some people effectively subsidise other. This is particularly the case with joint costs.

Some costs are easier to assign than others, for example, it is relatively easy to assign station costs to only those people using a particular station. For track infrastructure where people from multiple stations consume various parts, the formula is more complex. The method suggested here can also be applied for those end-to-end joint-cost items such as rollingstock capital and operating cost, track and signal maintenance, tram crews etc.

1.9.2 AECOM Approach

AECOM has used a simple bottom up building blocks approach in assigning costs to particular pieces of the modelled HNSLR network. In particular this draws on the Activity Based Costing Principles underlying the National Freight Group (2) Costing Conventions for Rail Systems in Australia.

For this simplified network the following assumptions have been made to maintain some compatibility with the ACIL Tasman approach:

- Track costs are based on $3 million per route km plus $300,000 per km for signalling.
- From Stage 2, there are 15 level crossings between Hobart and Claremont. A nominal $750,000 each has been allocated and these have been placed in the relevant line section.
- Three intermediate crossing loops have been added at $500,000 each including track, points and signalling.
- The main driver of track costs is distance related. For other classes of activity and cost e.g. for tram crews, the major driver is time related. For cost items such as rolling stock there is a mix of time and distance. For example, some items like wheels have distance related wear and tear, but electrical systems are consumed even if the tram is stopped. The basic track infrastructure costs are summarised below in **Table 18**.

Table 18 Track Properties and Estimated Costs

Line Section	section km	Level crossings	Loops	Annuity $m
Hobart - New Town	4.7	3	1	1.47
New Town - Moonah	1.2	3		0.50
Moonah - Derwent Park	1.7	1	1	0.55
Derwent Park – Glenorchy	1.4	2		0.49
Glenorchy - Berriedale	2.8	4	1	1.03
Berriedale - Claremont	2.9	2		0.89
Total	**14.7**	**15***	**3**	**4.94**

Source: Stage 2 Report, page 13.

The next process is to allocate the costs among the patrons. AECOM has used a simplified model based on the information in the Business Case. The purpose of the model here is to demonstrate the technique rather than to definitively determine the costs. It is however a relatively simple matter to substitute in the hypothetical patronage if it becomes available. AECOM has used a sample year 1 patronage estimate for No Sparks (25,000 trips per week) and Strong Sparks (90,000 trips per week). It is assumed all forward trips are matched by a return trip factored up from the morning estimate. This is the same as the Stage 3 Report estimate in Table ES2.

Thus in the morning 70% of passengers go to the CBD from the other six stations. Thirty percent go in the opposite direction, for simplicity it is assumed they all go to Glenorchy. Assume that 20% of the morning travellers join at Glenorchy and the other 5 stations account for 10% each. Estimated trips per week over each line section are shown below in for the CBD – Claremont network. This is outlined in **Table 19**.

Table 19 Estimated Trips per Week Allocated to Line Sections

Line Section	Trips per Week ('000)	
	No sparks	Strong Sparks
Hobart - New Town	25.0	90.0
New Town - Moonah	22.5	81.0
Moonah - Derwent Park	20.0	72.0
Derwent Park - Glenorchy	17.5	63.0
Glenorchy - Berriedale	5.0	18.0
Berriedale - Claremont	2.5	9.0

The next stage is to assign costs of each line section to the trips on that section. Based on the simplistic model outlined here there is a clear stepped function beyond Glenorchy as summarised in **Table 20**.

Table 20 Estimated Cost per Trip per Section, CBD to Claremont Network

Line Section	Annuity	Cost per trip ($)	
	($m)	No Sparks	Strong Sparks
Hobart - New Town	1.47	1.13	0.31
New Town - Moonah	0.50	0.43	0.12
Moonah - Derwent Park	0.55	0.53	0.15
Derwent Park - Glenorchy	0.49	0.54	0.15
Glenorchy - Berriedale	1.03	3.95	1.10
Berriedale - Claremont	0.89	6.86	1.91
Total	**4.94**	**13.44**	**3.73**

Even though the data is not the same as used in the Business Case, similar conclusions can be reached. However, in a holistic network such as this, the decremental impacts of paring back the network are worth noting.

Table 21 summarises the impact if the HNSLR is terminated at Berriedale rather than Claremont. Of the No Sparks and Strong Sparks weekly patronage, the 10% formerly assigned to Claremont has been removed rather than reallocated. This has made the unit cost higher for each line section.

Table 21 Estimated Cost Per Trip per section, CBD – Berriedale Network

Line Section	Annuity	Cost per trip ($)	
	($m)	No Sparks	Strong Sparks
Hobart - New Town	1.47	1.26	0.35
New Town - Moonah	0.50	0.48	0.13
Moonah - Derwent Park	0.55	0.61	0.17
Derwent Park - Glenorchy	0.49	0.63	0.18
Glenorchy - Berriedale	1.03	7.90	2.19
Total	**4.04**	**10.88**	**3.02**

The pattern is repeated if Glenorchy is made the northern terminus as shown below in **Table 22.** The problem is that as the high unit cost extremities of the network are removed, this gives less volume over the remaining “trunk” network which in turn drives up the unit cost for those parts.

Table 22 Estimated cost per Trip per Section, CBD- Glenorchy Network

Line Section	Annuity	Cost per trip ($)	
	($m)	No Sparks	Strong Sparks
Hobart - New Town	1.47	1.41	0.39
New Town - Moonah	0.50	0.55	0.15
Moonah - Derwent Park	0.55	0.71	0.20
Derwent Park - Glenorchy	0.49	0.76	0.21
Total	**3.02**	**3.43**	**0.95**

This process has been replicated until the network comprises only two stations, Hobart CBD and New Town. Progressively the $1.47miliion annuity of the first section (Hobart to New Town) has less and less patrons so the unit cost increases. This effect is shown below in **Table 23**. As the northern terminus moves closer to Hobart, the cost per passenger per section moves to the right across the table. Thus for example, the estimated $1.47m annuity for the Hobart – CBD section is shared by 25,000 passengers per week when Claremont is the northern terminus.

Progressively dismantling the network means ultimately there are only two stations left, Hobart CBD and New Town, there are only 2,500 passengers per week, yet the infrastructure cost remains unchanged. Clearly the two station model would not be a functional network.

In terms of optimising the location of the northern terminus, Glenorchy stands out because not only is it a major generator but also a major attractor of the Hobart originating trips. Moving the terminus in to Derwent Park only saves a small amount of infrastructure but potentially eliminates 60% of the patronage.

Expanding outwards to Berriedale means the full $1.03 million of infrastructure for the Glenorchy- Berridale section is entirely attributable to the 2,500 people per week using Berriedale station. There are however slight savings for passengers boarding at say Glenorchy where the total trip cost decreases from $3.43 to $2.98; Derwent Park: $9.95 to $2.35 and so on.

The point is that joint costs can be shared, but stand-alone costs cannot. It is important not to confuse this with concepts of cross subsidy at the cost level. The allocative mechanism demonstrated here shows people travelling from New Town to Hobart CBD are not paying for infrastructure they do not use – e.g. Glenorchy to Berriedale. Clearly this is the “User Pay” principle operating and this is the fairest and most efficient way paying for infrastructure. In **Table 23**, the turquoise coloured cells represent the stand alone user pays incremental cost as each new section extends northward from Hobart. Thus for example, if Derwent Park is the northern terminus, the $4.25 cost for the infrastructure Moonah to Derwent Park section is solely attributable to Derwent Park passengers based on user pay principles.

A cross subsidy would occur if an inequitable fare structure not based on user pay principles e.g. one fare for all trips regardless of station. This is not necessarily a bad thing, but it is just inefficient and inequitable and may lead to over or under supply of infrastructure and services.

Table 23 Infrastructure Cost ($) per Passenger per Trip (No Sparks)

Section	Claremont	Berriedale	Glenorchy	Derwent Park	Moonah	New Town
Hobart - New Town	1.13	1.26	1.41	3.77	5.66	11.32
New Town - Moonah	0.43	0.48	0.55	1.92	3.85	
Moonah - Derwent Park	0.53	0.61	0.71	4.25		
Derwent Park - Glenorchy	0.54	0.63	0.76			
Glenorchy - Berriedale	3.95	7.90				
Berriedale - Claremont	6.86					
Total	**13.44**	**10.88**	**3.43**	**9.95**	**9.51**	**11.32**

The other point worth noting is that many transport operating costs including time based costs are distance related. Just as the incremental distances beyond Glenorchy are higher than between stations in the inner network, it is likely that operational costs will commensurately increase just as infrastructure costs have. At the same time patronage does not increase at the same rate as costs. Further if a single network wide fare operates, sectional revenue yield across the network will fall. Thus it is certain that extending the line beyond Glenorchy will worsen BCR, NPV and cost recovery.

Figure 3 uses the data from **Table 23** to show the change in average costs over each line section as standalone and joint costs change as a result of moving the northern terminus.

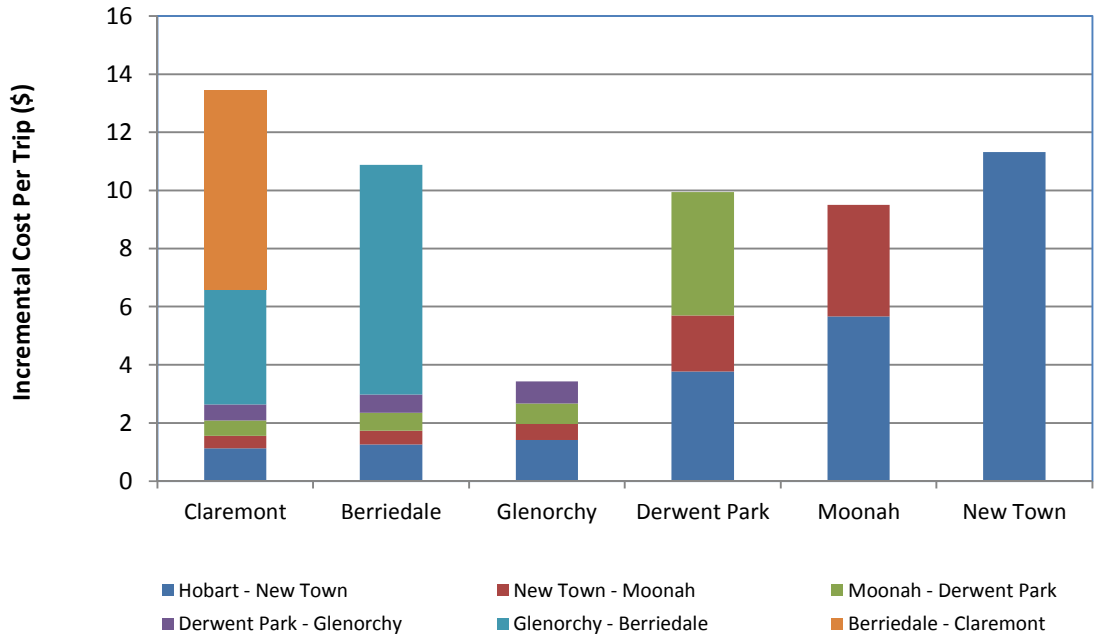


Figure 3 Incremental Infrastructure Cost per Section per Trip (No Sparks)

Table 24 replicates the processes of **Table 23** except with the higher strong Sparks Effect patronage level based on 90,000 trips per week. It too clearly demonstrates that in terms of network optimisation Glenorchy is the best choice for a northern terminus since its end to end costs are the lowest and the incremental cost of adding new sections is also the lowest of all stations.

In terms of extending the network beyond Glenorchy, the next two sections are nearly 3km each compared with other sections such as: New Town to Moonah - 1.2km, Moonah to Derwent Park - 1.7km and Derwent Park to Glenorchy – 1.4km. The outer areas typically have lower population densities and greater distances to join the railhead meaning they are doubly disadvantaged in terms of public transport accessibility and market share.

Table 24 Infrastructure Cost ($) per Passenger per Trip (Strong Sparks)

Section	Claremont	Berriedale	Glenorchy	Derwent Park	Moonah	New Town
Hobart - New Town	0.31	0.35	0.39	1.05	1.57	3.14
New Town - Moonah	0.12	0.13	0.15	0.53	1.07	
Moonah - Derwent Park	0.15	0.17	0.20	1.18		
Derwent Park - Glenorchy	0.15	0.18	0.21			
Glenorchy - Berriedale	1.10	2.19				
Berriedale - Claremont	1.91					
Total	**3.73**	**3.02**	**0.95**	**2.76**	**2.64**	**3.14**

However, having noted the above findings, just because Glenorchy represents the optimised northern terminal in terms of unit infrastructure costs with respect to alternative stations, this does not mean the project is economically and financially viable nor is it necessarily operationally feasible. This conclusion is reached in the Business Case and independently verified by this peer review process.

1.10 Conclusions

The purpose of Part One of this report has been to review the original HNSLR Business prepared for DIER by ACIL Tasman in August 2011. The peer review process has focussed on eight key areas, namely:

- The economic parameters used
- The appropriateness of the demand generators, particularly with regard TODs and Spark Effect
- The calculation of the benefit stream
- The validity of the cost parameters
- The cost-benefit analysis approach, particularly with regard to consumer and producer surplus
- The identified non-monetised costs and benefits
- The sensitivity testing used
- An assessment of the optimal length of the HNSLR Line.

In addition, throughout Part One, comment has been made as to whether the HNSLR Business Case is in alignment with Infrastructure Australia (IA) requirements (Infrastructure Australia, 2012).

It is the Peer Review team's finding that the HNSLR Business Case prepared by ACIL Tasman for the Tasmanian Government Department of Infrastructure, Energy and Resources (DIER) is in essence a fair and sound appraisal of the economic benefits and costs of the HNSLR project. It also generally adheres to the requirements of Infrastructure Australia.

However, overall the Business Case is likely on the optimistic side, with some capital and operating costs on the low side (see **Section 1.5**). In addition, there are some capital costs, operating costs and operational caveats that have not been appropriately accounted for in the project case and when these adjustments are accounted for, inevitably the project will not have a positive NPV or favourable BCR.

In addition, the inclusion of the strong demand generators (TODs and 'Sparks Effect') has also likely artificially increased patronage, and therefore the benefit stream.

While the implications of TOD development on HNSLR patronage and consumer surplus have been applied by ACIL Tasman using a satisfactory method, it must be recognised that their assumptions are highly optimistic and in reality, the overall impact of TOD development on the light rail patronage may not be realised in full given the population, timing and regulatory environment in which it will operate.

Further, the inclusion of the strong Sparks Effects artificially inflates demand and there is limited evidence the effect exists let alone if it can be generated practically by actually changing the utility and costs of each passenger trip. Unless other attributes are apparent, the presence of having a rail based mode on its own cannot be assumed to generate such significant levels of additional patronage.

It is acknowledged that the provision of a Light Rail system in Hobart may offer some benefits such as:

- Providing reliable travel times and a comfortable journey for users
- Supporting the consolidation of urban form, such as supporting the development of identified TODs in Glenorchy and Moonah, in the medium to long term
- Reducing congestion on the roads in the long term, should a sufficient number of motorists switch to using the light rail
- Improving access to the rest of the city for residents of Bridgewater and Brighton.

However, as highlighted by ACIL Tasman in the Stage 3 Report (page 26), and an assertion the peer review team supports, patronage on the HNSLR is forecast to be low due to the fact that too few people obtain travel-time savings from switching to rail, and thus are unlikely to do so. As such, the estimated benefits do not outweigh the capital costs that are needed to upgrade the existing freight line for passenger rail, as well as the ongoing operational costs that would be required to manage the line.

If an increase in patronage were to occur along the lines of a strong Sparks Effect (due to the attractiveness of rail due to safety, reliability or comfort), it may be that patronage numbers increase to such a large extent as to make the investment in light rail economically feasible. However these assumptions are very optimistic and come with very high risks, and based on current analysis of the Greater Hobart region, this outcome would be highly unlikely.

In addition, the provision of light rail alone cannot be assumed to provide the uplift in the use of public transport that would be required to see a large shift in patronage. As a minimum, the provision of light rail would need to be supported by significant changes in the Greater Hobart community, such as changes to the local government planning schemes to support TODs through regulations regarding higher density along the rail line, and reducing the provision of car-friendly developments. This would be the minimum likely required to see an increase in patronage beyond which might be expected based on the current travel options and habits. It is not clear to date that this additional investment and regulatory reforms have been committed by the relevant stakeholders. And that broad community support is there for these changes.

In addition to the assessment of the Business Case, value optimisation analysis assessment of the optimal length of the HNSLR line, showed that, based on current population levels, Glenorchy is the best choice for a northern terminus since its overall net costs are the lowest and it is not only a major generator but also an attractor of trips. Extending the line beyond Glenorchy would worsen the BCR, NPV and cost recovery.

Part Two

2.0 Community Advisory Panel Submissions

On 19 October 2012, the Minister for Sustainable Transport wrote to the former Community Advisory Panel (CAP) members for the HNSLR Business Case, inviting them to submit a written response to the HNSLR Business Case. The purpose of these submissions was to allow CAP members to raise any concerns with the original business case.

This section of the report outlines concerns raised by CAP members in their submissions, and provides in the context of the peer review process. In total six responses were received and are addressed in the following sections. The submissions are addressed in no particular order.

Section 2.1: Glenorchy City Council, see page 43

Section 2.2: Hobart Northern Suburbs Rail Action Group (HNSRAG), see page 48

Section 2.3: Planning Institute of Australia, see page 60

Section 2.4: Dr Stewart Williams, University of Tasmania, see page 63

Section 2.5: Future Transport Tasmania (FTT), see page 66

Section 2.6: Hobart City Council, see page 73

As noted in Part One of this report, the purpose of the Peer Review is to review the methodology, assumptions and parameters used in the HNSLR Business Case and ensure that they align with what is normally expected for a submission to Infrastructure Australia (IA). As such, based on the Peer Review's terms of references, responses to submissions will focus on responding to points raised regarding the business case / IA process. Support documents provided in some of the submissions were used as reference material where necessary when responding to CAP members' concerns; however they have not been addressed separately.

Additional comments in the CAP submissions regarding the importance of providing improved public transport (and in some cases light rail) in greater Hobart, while valid and of importance to note, are outside the scope of the Peer Review process, and are addressed only in very general terms.

2.1 Glenorchy City Council

Item	Feedback	Response
1)	Did the business case meet the Terms of Reference and Contract Specification? The peer review out to ensure that the Business Case prepared by ACIL Tasman met the terms of reference of the Business Case and contract specification for the project.	The Terms or Reference for the HNSLR Business Case are set out in detail in the Business Case Summary Report (published August 2011). The purpose of the peer review was to review the findings of the Business Case, as set out in the Request for Quotation for the Peer Review which stated: *The objective of the Peer Review is to ensure that the assessment of economic benefits and costs associated with the LRBC was justified and appropriate….The Department seeks assessment of the overall economic evaluation conducted in Stage 3 as well as the scoping exercise conducted in Stage 1. In particular, the Department has to be confident that the approach and values used are appropriate for use as part of submissions to Infrastructure Australia (IA).* Part One of this report sets out our findings with regard to whether the original ACIL Tasman HNSLR Business Case provided a robust economic evaluation of the proposed light rail. The overall findings of the review were that the HNSLR Business Case prepared by ACIL Tasman is in essence a fair and sound appraisal of the economic benefits and costs of the HNSLR project. If anything, the Business Case is likely on the optimistic side, with some capital and operating costs below what could be expected for this project. In addition, there are some capital costs, operating costs and operational caveats that have not been appropriately accounted for in the project case and when these adjustments are accounted for, inevitably the project will not have a positive NPV or favourable BCR. In addition, the inclusion of the strong demand generators (TODs and 'Sparks Effect') has also likely artificially increased patronage, and therefore the benefit stream.
2)	Hobart Northern Suburbs Rail Action Group and Use of Conservative Assumptions.	See responses to Hobart Northern Suburbs Rail Action Group in **Section 2.2** below.
3)	Non-Monetised Costs and Benefits There were also a range of non-monetised costs and benefits identified by the original consultancy team, including: - Interruption to traffic at crossings - Transit Orientated Development - Social costs of congestion alleviation - Social inclusion benefit	Non-monetised costs and benefits are generally items which cannot be readily valued in monetary terms as attempts to value them can involve expensive processes that yield results with very wide margins of error. As such, non-monetised costs and benefits are not included in a CBA and do not have an impact on the benefit/cost ratio. However, recognition is given to non-monetised costs and benefits by describing them in qualitative terms. IA incorporates these non-monetised costs and benefits into the

Item	Feedback	Response
	It would be useful to further explore these non-monetised costs and benefits in the peer review to consider their order of influence of the benefit/cost ratio bottom line.	appraisal process and requests the proponents to provide supporting information on the scale of these impacts. Within the HNSLR Business Case, ACIL Tasman has provided commentary regarding these likely costs and benefits and their likely scale of impact (rated on a sale from low to high). The validity of these non-monetised costs and benefits and their assigned ranking has been further assessed in Part One of this report. Please see **Section 1.7**. Further studies could be funded by DIER to attempt to put some values on the identified non-monetised costs and benefits, however, these are likely to have wide margin of errors, and would still not be included in the conventional CBA, but addressed separately as wider benefits and costs. In addition, it is unlikely findings would fundamentally change IA's overall assessment of the business case, given the very low BCR. IA guidelines suggest that "significant WEBs [or non-monetised benefits] will only be found in proposals with strong traditional benefits, since WEBs require high levels of behaviour change, e.g. strong demand for the new asset".
4)	<u>Changes in Context – Changes in Policy Context</u> Changes in policy context include: - Southern Tasmania Regional Land Use Strategy 27 October 2011 - Economic Development Plan August 2011 - Regional Economic Development Plan (to be launched mid November 2012) - Legislative Council Inquiry into Integrated Transport Options in Southern Tasmania The Regional Land Use Strategy is important and relevant because it identifies containment of growth within an urban growth boundary and densification along high frequency public transport corridors as key strategy. It includes the setting of growth and density targets. The State and Regional Economic Development Plans are important and relevant because one of their core goals is to improve the social and	Consideration of the strategic planning directives for Greater Hobart are of key importance and should be considered in all project appraisals by DIER, the Tasmanian Government, and IA as appropriate. However, the low BCR in the HNSLR Business Case indicates that the implementation of the light rail, despite the benefits for the strategic direction of Hobart, does come with very high risks with regard to the required public subsidy which might be required to maintain the rail line. The possible contribution of HNSLR to the strategic planning objectives for Greater Hobart has been captured within the non-monetised cost and benefits of the HNSLR proposal (see **Section 1.7**). It could be that further elaboration is included in these components for consideration by IA, particularly with regard to the support of the strategic intent of agglomeration and urban consolidation. Particularly given that the Southern Tasmania Regional Land Use Strategy was launched after the initial HNSLR Business Case was prepared. However, it should be noted that alternate high quality public transport services could also achieve a similar outcome (such as an improved bus

Item	Feedback	Response
	environmental sustainability of the economy. This moves issues such as investment in public transport to a central place in the economic development of the State and region.	system). The development of four TODs (at Derwent Park, Moonah, Glenorchy and Claremont), while not entirely appropriate in their location, were included in the HNSLR Business Case patronage forecasts in an attempt to factor in some of the additional demand that would be generated from increased densification along the rail route (see **Section 1.3.1**). Even with this higher demand and the sensitivities that were conducted on even higher demand (up to 170% of the base projection) a BCR of above 0.2 was not generated. For further information see the following sections: - Discussion of the use of TODs in the Business Case: See **Section 1.3.1** - Discussion of the non-monetised costs and benefits: See **Section 1.7**
	<u>Changes in Context – Changes in underlying conditions and parameters</u> There are a number of changes in underlying conditions and parameters since the Business Case was prepared that might affect the outcomes of the modelling. These include:	See below responses 5-11 below.
5)	Changes in the general price level since the Business Case was prepared	In CBA analysis, all monetary values need to be converted to a standard current dollar term to be comparable. As such, the change in the general price level year-on-year is not applicable, assuming all values have been converted to a single year and compared at this level. This was done in the HNSLR Business Case.
6)	Availability of 2011 Census data	The variable within the CBA which is relevant to Census data is population change. The change recorded between the 2006 and 2011 Census for the LGAs are as follows: - Hobart: 0% - Glenorchy: 1% - Brighton: 2% However, the HNSLR Business Case undertook sensitivity testing against the population growth rates which align with the Tasmanian Treasury population growth estimates (low, medium and high). It also undertook sensitivity analysis with different patronage levels for the strong Sparks Effect market capture level. The outcomes are shown on page 30 – 32 of the Stage 3 Report.

Item	Feedback	Response
7)	Need for review of the discount rates used in the calculation of the benefit/cost ratio for their currency and appropriateness	The discount rates used for the HNSLR Business Case align with the requirements of Infrastructure Australia submission (2012, p. 19), and are appropriate with real rates of 4%, 7% and 10%.
8)	Need for review of the currency of the borrowing rate for amortisation purposes	The Business Case assumes borrowing at 7% real rate. Based on 2% annual inflation this is equal to a nominal 9.1%. This is an appropriate borrowing rate.
9)	Additional patronage as a result of visitation to MONA significantly exceeding the 300,000 assumed on p. 29 of the Stage 1 report (now believed to be 400,000 or more per annum).	The assumptions in the Business Case Stage 1 report were used as a basis for establishing the preferred route and establishing the context for the project. In this report the MONA visitation rates were used in estimating the overall use of the HNSLR system. However in the Stage 3 report, patronage from tourists and other visitors to greater Hobart were not included in the BCR calculation, due to the difficultly in quantifying the likely extent of patronage. Instead, the benefits for tourists were described qualitatively as a non-monetised benefit. Hence an increase in the visitor numbers to MONA, while important to consider as a non-monetised benefit of HNSLR, will not change the reported BCR. Further data and text could be included within the non-monetised Tourism Benefits component to account for the increased visitation and the potential positive benefits for tourists accessing the site in Hobart (noting also the potential drop in business for the current ferry and bus operators providing transport to MONA).
10)	Change in bus patronage over the intervening period, including fare box revenue, patron numbers and composition.	The Business Case assumes some redesign of bus routes including the operation of feeder service to proposed stations. There is an implicit transfer of some present day bus passengers to HNSLR on the basis of the 800 metre radius rule. Further, sensitivity testing was undertaken to try to measure the additional impact of possible additional patronage beyond the “base case”. This additional patronage did not significantly improve the BCR. It is also noted that Metro patronage has declined over the last year, likely due to the economic conditions in Tasmania (Arndt, 2012), indicating in the short term public transport demand has decreased.
11)	Increased petrol prices (the price per litre for fuel has increase significantly from the $1.20 assumed in the Business Case).	This is a high level model using constant costs. Sometimes various factors change price independent of the CPI. See response to comment #18 in **Section 2.2**.

Item	Feedback	Response
12)	Delivery Model There appears to be an implicit assumption that the light rail project, were it to proceed, would be wholly funded by government. It may be beneficial to consider whether a different delivery model for the project such as a public/private partnership would have any impact on project feasibility.	The terms of reference for the Peer Review require the review of the original business case methodology, assumptions and parameters and their suitability for an IA submission. Commenting on the viability of alternate delivery models is outside the scope of this review; however the low BCR indicates that it would be unlikely that the light rail would be commercially viable and attractive to private investors.

2.2 Hobart Northern Suburbs Rail Action Group

An additional supporting report entitled *Case for the Hobart & Northern Suburbs Railway* was provided by the HNSRAG as part of their submission. As this report provided more general support for light rail, rather than addressing directly concerns with the HNSLR business case, the report has not been addressed in detail below, however it was used as supporting evidence as needed when addressing concerns raised by the HNSRAG regarding the HNSLR Business Case.

Item	Feedback	Response
Stage 1 Report		
1)	Likely rail ridership was assumed to be equivalent to existing public transport ridership along the route. This is not comparable or indicative of what ridership could be achieved with a faster and more frequent public transport option which in some instances (e.g. Brighton-Hobart) reduces existing public transport transit times by almost 70%.	The Stage 1 report provided an overview of options for improving public transport in Hobart. This included both regulatory changes as well as bus and rail solutions. After examining various options, the light rail solution was chosen to be considered further. The Stage 1 Report took existing public transport (PT) as a starting point in estimating HNSLR patronage. However, in the Stage 3 report, ACIL Tasman made use of utility functions based on service offering as a way to estimate patronage. Further detail can be found in **Section 1.6.1** in Part One of this report. In order to overcome the extreme uncertainty in accurately estimating patronage based on the existing trends, a number of patronage scenarios were developed. These ranged from a no sparks case to a strong sparks effect which was much higher. Neither estimate is right nor wrong however, in the most optimistic case the strong Sparks Effect case was estimated to just break even albeit with major caveats on the cost side and the assumption that a bare bones service could match Perth's offering (in terms of improvements in comfort and service level). According to recent Metro data, Hobart PT usage has been decreasing (Arndt, 2012). There is a presumption by some that the HNSLR will partially correct this trend in the longer term by offering faster and better services than those offered now by buses. However, door to door travel time includes many factors apart from crude in-vehicle transit time. It is clear that cars are the major alternative to PT and to improve on motorists' total travel time (which will on average have much shorter walking components); HNSLR must achieve considerably faster speeds enroute. Based on average transit times for passenger rail in other cities, authorised top speeds of 100 km/h normally result in about 50km/h average speeds, depending on the number of enroute stations and the length of uninterrupted sections. In the Stage 2 Report, the HNSLR Business Case assumed an average operating speed

Item	Feedback	Response
		of 40km/h (and a hypothetical maximum alignment speed of 60km/h). Yet to get the mode transfer effect requires even higher speeds than those hypothesised in the business case. The result of artificially inflating HNSLR speeds is to make HNSLR much more attractive vis-à-vis other modes resulting in higher patronage for HNSLR. The hypothesised maximum speed of the light rail system is expected to be slightly above 60 km/h, with an average speed for the service between 40km/h and 44km/h. Given the current state of the track and the proposed budget, these expectations are unlikely to be achieved. These assumptions regarding the train travel speed underpinned the analysis in Stage 3.
2)	Modelling a best case scenario of 15% walk-on ridership is not generous nor a comparable percentage with other cities. ACIL Tasman confused the public transport patronage percentage of an entire city with that of the public transport patronage percentage in an 800m radius of a station. Whilst across the entire city of Sydney there may be 15% public transport patronage, that patronage increases significantly in proximity of rail stations	For some time Sydney Planning Acts have proactively enforced high density activities (including residential densities) around station precincts to encourage public transport patronage and lessen dependency on cars. This has not been proposed for outer suburban Hobart and adjoining authorities in published legislation. It is noted however that higher densities (and subsequently TOD development) is encouraged, but not legislated, through the *Southern Tasmania Regional Land Use Strategy 2010–2035.* Higher densities must first be established within Hobart to generate an increased proportion of potential patronage. The low urban density in Hobart, compared to the urban density in Sydney, has a lower capacity to support higher patronage numbers as there are far fewer people in the areas immediately surrounding train stations. In addition, the HNSLR alignment's close proximity to the Derwent River means there is not a true 800m radius capture area at many proposed stations thus reducing potential patronage. Section 5.2 of the Stage 1 Report, which contains the 15% patronage estimate is considered optimistic and qualified by *"is much more than the current public transport share of trips which is 3.5 percent."* and *"at this stage, we are only looking at ballpark demand, and thus prefer to err on the side of estimating too much demand rather than too little."* The Peer Review team would support this statement.

Item	Feedback	Response
3)	Failure to include purpose designed feeder bus services and the impact that they would have on encouraging multi-modal, integrated public transport journeys and ultimately through good integrated service coverage a shift from private transport	The impact of feeder services is largely irrelevant as the impact would be relatively constant across the stations. This is covered in the Stage 1 Report Q&A: *"The additional bus patronage has not been included in the study at this stage. This patronage would not have any impact on the determination of the optimal length of the rail line, as the impact would be largely consistent across all stations."* In the Stage 3 Report, feeder bus services were included within the model, with one trip possibility being "Walk to a bus stop and catch a feeder bus before catching a train." As such patronage for HNSLR is captured from as far away as Brighton and Bridgwater (through the feeder bus services). The issue the Peer Review had with this is that the Business Case assumed that this feeder bus service timetable aligned perfectly with the HNSLR system at all stations so that there is zero waiting time between services. In reality, there would be a wait between the bus and light rail for commuters and this would impact on the overall travel time. In addition, multimodal solutions work best when there are quick seamless transfers and the overall trip times are long, so that non-mobile activities (e.g. waiting) can more easily be absorbed into overall trip time. However in the case of HNSLR overall trips times are fairly short (less than half an hour for Glenorchy to CBD) meaning wait times become a higher proportion of total travel time.
4)	No acknowledgement that once established it was likely that the areas around the stations would experience significant growth both in residential terms but also business and that as a result more trip generating factors would emerge	Urban consolidation was not considered in the Stage 1 analysis; this would not fundamentally change the outcomes of the Stage 1 analysis, as high density would have a fairly even impact on all stations for purposes of analysis in stage 1. The inclusion of TODs was included in the Stage 3 report, and the final BCR calculation, and this is addressed further in #16 below.
5)	Failed to properly consider and account for the 'spark effect' associated with rail in the face of clear evidence that integrating existing public transport networks with rail acts itself as an attractor and in some cases can almost quadruple patronage along the same corridor	The strong Sparks Effect was considered implicitly in the Stage 1 report and included in more detail in the Stage 3 report, which affected the final BCR calculation. As noted in the Stage 1 Q&A: *Recent research suggests that rail services may increase levels of demand on existing public transport corridors by as much as 20 per cent. An increase in demand, roughly equivalent to the 'sparks effect', has been implicitly included in the study, through the higher levels of estimated walk-on patronage.*

Item	Feedback	Response
		For further discussion on the inclusion of the Spark Effect see #24 below.
6)	Limited formal and informal park 'n' ride to just one facility/station. Most stations on the railway have existing (informal) parking available and several stations have considerable scope for expansion of parking facilities. Park 'n' ride is highly successful at most rail stations on mainland Australia;	The Business Case also did not account for the enormous cost of traffic congestion, accident, loss of amenity, etc. if streets around stations suddenly become permanent car parks. The costs of providing bays for feeder buses at stations has also not been considered and nor have the operating costs of the feeder buses. It would be unbalanced to only include the benefits of say park and ride without including the full cost of providing the facilities. These additional costs and benefits could feasibly be included within the CBA however it is the Peer Review position that the additional benefits of providing the Park 'n' Ride are unlikely to outweigh the costs of providing the facilities, and also bring about a significant improvement to the current BCR. It is unknown which KPIs are used to determine that *"Park 'n' ride is highly successful at most rail stations on mainland Australia."* The Peer Review team agree with the Business Case, as outlined in Section 5.2 of Stage 1 Report which notes *"Realistically, Bridgewater and Claremont are the only two options for a large, dedicated park n ride. If the park n' ride is placed further in than Claremont, then travel time savings are relatively small, and it is less likely that people will actually get out of their car and use the light rail system once they have driven so far in. Granton has topographical issues, and a much lower surrounding population."*
7)	Failed to properly consider "kiss n ride" as a ridership option, again contrary to rail experience in other jurisdictions	Public transport interchange experience indicates that kiss 'n' ride has a minimal impact on patronage numbers. As such, provision of these facilities would have minimal impact on the BCR.
8)	Excluded or limited student patronage numbers on the basis that to include it would be "likely to reduce the overall viability of the LRS", which defies logic	Section 5.2 of Stage 1 Report notes *"Specific student trips on school services typically undertaken by travel from residences to schools were generally excluded with the exception of those travelling to places located near the proposed HNSLR stations."* What ACIL Tasman is saying is that if people are already catching buses or walking, it is unclear that they would gain an additional benefit from walking to the train station and catching a train.

Item	Feedback	Response
		Regarding viability, this has been addressed in the Stage 1 Q&A. To paraphrase: *"Increasing demand for rail services by diverting existing school bus passengers onto rail services is an option that has been considered. Although it may appear an obvious way to secure a strong passenger base for the LRS, maximising peak demand with school students is likely to reduce the overall viability of the LRS.* *The provision of rail infrastructure, including rolling stock, track and (potentially) stations, to cater for students, and required for only two hours on school days, will significantly increase capital and operational costs, with this additional infrastructure not being used outside school times."* Thus in peak hours, capacity will be such that full fee paying adults will be squeezed out by students and concessional ticket holders which will adversely impact on fare box revenue.
9)	Failed to consider existing road traffic as an indicator of likely demand and opportunity for modal shift, particularly as the railway line parallels the two most congested arterials in Tasmania (Brooker Hwy and Main Road)	In developing the generalised cost of travel model, the Business Case accounts for traffic congestion by factoring lower operating speeds for cars to reflect levels of congestion in different parts of the network at particular times of the day. Note that there is no congestion in the counter flow direction therefore cars should have a particular advantage in terms of transit time. Thus if say 10% 20% or 30% of HNSLR patrons travel in the reverse direction and are included as public transport patronage, it is probably 10%, 20% or 30% overstated. Stage 1 report Q&A. covered this point: *"Increasing demand for rail services by diverting existing school bus passengers onto rail services is an option that has been considered."*
Stage 2 Report		
10)	Limiting the study scope between Hobart and Claremont resulted in a non-optimal operating model with irregular section lengths between passing loops stations. This yielded delays and increased transit times. Modelling subcontractors, Plateway, expressed concerns to me that the rail model was inefficient (non-optimal).	The Stage 1 report provided background data and a simple network optimisation model to determine the extent of the network based on the incremental cash flows associated with additional stations using an annuity based on fare box revenue minus the costs associated with operating that station including the apportioned operating and track costs. This showed the incremental costs of going beyond Claremont were out of proportion compared with the rest of the HNSLR. For this reason the northern terminus became

Item	Feedback	Response
		Claremont. Optimal operations are not just about section lengths. Other important issues include the optimal positioning of stations to best serve the patrons. The question is therefore: is the railway designed for the public usage or as an example of rail excellence. These are often not the same thing. For further detail see **Section 1.9** in Part One of this report**.**
11)	Increased journey times had a detrimental compounding effect of reducing likely patronage and thus undermining overall benefits	The Business Case assumes unrealistically high operating speeds given the track and number of stations and level crossings. In turn this would overstate capture from alternative modes (see **Section 1.4**). This has inflated the HNSLR patronage, BCR and NPV. Journey times are of course comparative and the comparison should be directed between HNSLR and cars since buses only handle a small volume of patronage. Outside peak hours, HNSLR does not have a high enough travel speed (and therefore overall travel time) that will allow it to increase its performance to match what cars will do outside the peak. At best the morning and afternoon peaks only cover 20% of patronage movements, thus even if HNSLR can match peak hour performance it will lose 80% of the time. To sum up: generally door-to-door transit times for rail based travel will not match the performance of cars in suburban Hobart.
12)	Future expansion beyond a Claremont terminus would likely require costly relocation of existing passing loops stations	This is confirmed in Section 6 of Stage 1 Report and why the Stage 1 findings suggest the network should terminate at Claremont. Beyond Claremont cost increase and at the same time, patronage falls off rapidly making this a lose-lose situation. The decline in patronage occurs because the population density is low and there is little traffic congestion meaning road transit times are very competitive. For a review of the optimal length of the rail line see **Section 1.9** on Part One above.
13)	Concluded the entire track is not suitable for passenger trains based on a very brief inspection and track condition reports that pre-dated major track upgrade works including rail and sleeper replacements undertaken in the latter half of 2011	The HNSLR rolling stock will have to have modified wheels if it is to operate on the existing tracks designed for heavy rail. A survey in 2010 showed a maintenance backlog estimated at about $9 million to bring it up to a basic standard. A basic standard for slow-speed low-volume freight operations is not the same as being capable of running high speed passenger trains bi-directionally on a 15 minute timetable.

Item	Feedback	Response
		Section 3.1.1 of Stage 2 Report notes: *"Based on the information supplied to Hyder by TasRail, the corridor comprises some tight curves at certain locations that would necessitate lower speed limits. To maximise speed and therefore minimise travel time, the curve radius could be increased or straightened by undertaking re- alignment works of the existing track. This was not considered in detail due to the high cost of constructing an alternative alignment."*
14)	Annualised rail maintenance costs are considered excessive given the 15 km of railway would be managed and maintained within TasRail's asset portfolio. The maintenance cost should also be apportioned to all rail users including freight and tourist rail operators	AECOM understand Toll are operating about one freight train per day to their depot. It would be unreasonable for them to share costs equally given HNSLR will be running 4 trains an hour in each direction. Given that level crossings will have to be updated to handle this workload, HNSLR will be the defacto prime user and therefore should be apportioned most of the cost. The Hyder estimate of $100,000 per km per year is not considered high for passenger rail systems (see **Section 1.5** in Part One for a detailed discussion of costs).
Stage 3 Report		
15)	Monetised benefits appear to be underrepresented and based on a flawed demand analysis adopted in Stage One and inadequate travel time savings promulgated in Stage Two	The demand analysis in Stage 1 was not used in Stage 3 which drew on a more complex analysis of utility functions, generalised costs, demand curve shape etc. In the case of HNSLR, travel time includes time walking/travelling to a station, intermodal transfer time if required, waiting time, in-vehicle transit time, station egress time, and walk to final destination. Given the relatively isolated location of the CBD terminal from the rest of the CBD and inner Hobart, any walking leg will be considerably longer than the equivalent for car and bus travellers who have a greater selection of in-vehicle exit points. Given these factors, sensitivity tests indicate even very large advantages in HNSLR travel time over alternatives will have a small impact on patronage. For further review please see **Section 1.4.2**.
16)	Wider economic benefits (economies of agglomeration) attributable to Transit Oriented Developments and Urban Renewal are not considered	Conventional cost benefit analysis does not include macroeconomic or wider economic impacts. There is considerable debate in the economic literature about the existence of WEBs and their quantification and their transferability from one location to another. There is also generally no recognition of the costs (WECs) associated with generating WEBs. For example, one does not abandon and therefore write off a $1 billion facility with established networks to hopefully access some WEBs. This creates an asymmetry in the treatment of benefits and costs which misleadingly overstates the net worth of a project. The possible contribution of HNSLR to the strategic planning objectives for Greater

Item	Feedback	Response
		Hobart has been captured within the non-monetised cost and benefits of the HNSLR proposal. This is recognised as an appropriate approach for items which cannot be readily valued in monetary terms as attempts to value them can involve expensive processes that yield results with very wide margins of error. IA gives consideration to these non-monetised costs and benefits in their appraisal process. The validity of the HNSLR Business Case non-monetised costs and benefits and their assigned ranking has been further assessed in Part One of this report. Please see **Section 1.7**. It could be that further elaboration is included in these components for consideration by IA, particularly with regard to the support of the strategic intent of agglomeration and urban consolidation. Particularly given that the *Southern Tasmania Regional Land Use Strategy* was launched after the initial HNSLR Business Case was prepared. However, it should be noted that alternative high quality public transport services could also achieve a similar outcome (such as an improved bus system). In addition, IA guidelines suggest that "significant WEBs [or non-monetised benefits] will only be found in proposals with strong traditional benefits". In addition to the above, the development of four TODs (at Derwent Park, Moonah, Glenorchy and Claremont), while not entirely appropriate in their location, were in included in the HNSLR Business Case patronage forecasts in an attempt to factor in some of the additional demand that would be generated from increased densification along the rail route (see **Section 1.3.1**). Even with this higher demand and the sensitivities that were conducted on even higher demand (up to 170% of the base projection) a BCR of above 0.2 was not generated. For further information see the following sections: - Discussion of the use of TODs in the Business Case: See **Section 1.3.1** - Discussion of the non-monetised costs and benefits: See **Section 1.7** Also please see the Planning Institute of Australia submission and Peer Review responses in **Section 2.3** below.
17)	ACIL Tasman's Stage Three Report lacks numerical data substantiating the value attributed to each quantifiable/monetised benefit	The Peer Review team agrees with this comment, this is a reporting style matter and would probably not be compatible with IA requirements and templates. This format does make the CBA calculations far from transparent and difficult to replicate some of the

Item	Feedback	Response
		calculations. It is noted that the basic outputs of BCR and NPV at various discounts rates are supplied in the normal format.
18)	No sensitivity analysis around flawed inputs into the consumer surplus demand modelling such as cost of parking in Hobart at a mere $3 per day (when it is a minimum of $10) and an average fuel price of $1.20 per litre which cannot be substantiated	The cost of parking and petrol impact on mode choice not on consumer surplus calculations for HNSLR. There is evidence that there is a considerable amount of free parking in the Hobart CBD. The $3 value in the HNSLR is considered an appropriate average of the range of parking costs available in Greater Hobart (remembering not all trips on the HNSLR will be to the CBD), based on data provided to the Peer Review team in the unpublished *Park and Ride Community Transport Survey* (DIER, 2010a). When assembling a generalised cost of transport, the $3 fee is approximately equal to a single HNSLR fare and worth about 11 minutes travel time based on $16.8 unit rate per person hour. The daily $3 parking fee is therefore worth about 5.5 minutes in each direction and is probably cancelled out by much lower out-of-vehicle time for motorists and their passengers (walking time) than public transport users, especially those using two modes. The fuel cost is only one of a large number of variables placed in the generalised cost model. High fuel prices may cause motorists to switch to public transport however, the issue is far more complex when issues such as the convenience and security of cars is traded off against longer walks in inclement weather, etc. As noted elsewhere, HNSLR patronage would have to equal the levels estimated in the strong Sparks Effects case for the project to have a positive NPV. This would be consistent with a mode share of about 50%. The complication is that these estimates also assume the capture of the counter direction flows (which could be say 30% of movements on HNSLR) however it is considered that car owners would have no reason to switch to HNSLR hence even the base estimates are overstated. Outside peak hours, the Brooker Highway does not have capacity problems indeed in the outbound direction Glenorchy is described as *"10 minutes north of Hobart on the Brooker Highway by car."* (Royal Agricultural Society of Tasmania, 2012)
19)	Little attempt to estimate or quantify/monetise benefits which should have been included. For instance it should have been possible to attribute a quantifiable value to land use integration within the transport network	Only particular classes of monetised benefits are included under the National Guidelines. Please see ATC National Guidelines (2006, p. 31 V 5): *"impacts on land values are excluded from BCAs. Improved access to properties as a*

Item	Feedback	Response
	(value capture) and to consider the savings from negating the need for alternatives such as capacity upgrades on the parallel Brooker Hwy (approx. $238 million: Hobart-Berriedale, approx. $1 billion: Hobart-Bridgewater	*result of a road upgrade may increase the value of the land. This is not a new benefit, simply the savings in time and vehicle operating costs reappearing in a changed form."* Cost Benefit Analysis treats each project as a standalone proposition. A decision whether the upgrade the Brooker Highway will stand or fall on its own merits (benefits minus costs) and for example, would not include a benefit such as "Opportunity cost saving of $ x million by not constructing HNSLR" because the latter would have its own particular costs and benefits. In other words, *Costs and benefits should be compared between the world with the project and without it* (NSW Treasury, 1997, p. 49)
20)	Benefits such as the amelioration of the social costs of congestion and social exclusion, the reduction of environmental pollution, and boost to tourism were not quantified yet should have been.	Please see ATC National Guidelines (2006, p. 18 V 4 and p. 35 V3) for a list of items which can be included in a conventional CBA analysis. The HNSLR Business Case includes the environmental impacts in the CBA as required. The social costs of congestion are accounted for in motorists travel time costs and vehicle operating costs. Other non-quantifiable benefits such as social inclusion, tourism have been described and rated as non-monetised benefits as required by the IA guidelines.
21)	Tourism (non-commuter) ridership and benefits have likely been underestimated or ignored (as they are not quantified). For example, the Royal Agricultural Society of Tasmania has advised the HNSRAG that annual visitations to the Hobart Showground are approx. 500,000 per annum. Other 'non-commuter' ridership apparently not considered includes the, KGV sports/community precinct, Tasmanian Hockey Centre, and Runnymede	Granted there are large numbers of people going to the showgrounds however it is unlikely that the northern suburbs light rail will serve a high proportion of this, given that people come from across Greater Hobart. The showgrounds attract 200,000 persons per year to the Sunday markets (4,000 per time) and 42,000 people (10,500 per day) attended the Hobart show in 2011/2012 (Royal Agricultural Society of Tasmania, 2012) The showgrounds are on the Brooker Highway and *"Metro Tasmania's regular Glenorchy service operates every 10 Minutes from Hobart Bus Mall during weekdays and every 20 minutes at weekends."* (Royal Agricultural Society of Tasmania, 2012). The "build and they will come" mantra is increasingly found wanting in the Australian infrastructure fields of transport, tunnels, toll roads, public transport, tourist attractions and resorts, etc. There are many recent incidents of over optimistic projections with catastrophic effects.
22)	Failure to quantify the benefits of providing a fully accessible (DDA Compliant) public transport option to those who currently cannot access	Agreed, this is not fully spelt out in the Business Case. However, neither are the additional costs attributable to compliance. It may be easier to estimate the cost of

Item	Feedback	Response
	public transport (wheelchair, scooter or pram users).	compliance than estimating the benefits which would result in an overly negative outcome. The Peer Review team consider that at a high level they probably balance each other out. Of course this does not mean invalidate the need for such passengers to access and travel to and from stations if desired.
23)	Failure to quantify the improved operating efficiencies that an integrated public transport would reap through reduced operational and labour costs to Metro Tasmania (as recognised in DIERs Main Road Transit Corridor Project)	The HNSLR business case appraisal is based on a low cost light rail option using an existing underutilised rail corridor. It is clearly not a full delivery service and therefore many of the features commonly expected in modern urban public transport systems are not included. This has several impacts: Firstly, upfront capital costs are much reduced compared with benchmarked full service operations such as in Perth. All things being equal, lower capital costs will tend to help viability, NPV and BCR. There is no comparative Metro Tasmania benchmark which can be referenced therefore it is unclear what the impact on actual costs will be. There is no guarantee that the level of service and patronage is compatible with the cost structure.
24)	With regard to the 'spark effect' (the phenomenon of significant increases in patronage directly attributable to a more attractive rail option) ACIL Tasman were "agnostic" about its existence even in the face of firm evidence that it exist and can be quantified specific to Australia's most recent metropolitan rail expansion with the Mandurah Line in Perth, WA. In the Summary Report they pay mere lip service to its impact on passenger demand and ultimately the BCR.	The Mandurah line has little in common with HNSLR. The 70 km haul takes about 50 minutes on a high speed alignment and there are only 11 stations providing long stretches where high speed can be attained. Major populations en route include Mandurah (83,000), Rockingham (108,000) and Kwinana (30,000). Almost all of the stations are fully equipped with multiple lifts plus multiple escalators, toilets, guards, park and ride facilities, bus interchanges, feeder bus services etc. When built the Mandurah project is estimated to have cost $1.66 billion (Anonymous, 2012). This has since been described as "fabulously cheap" (Davies, 2012). The $80 - $90 million budget estimate for HNSLR will not provide as attractive service and inevitably the 'spark' will be less brilliant.
25)	It is absurd to document a BCR of 0.0 (Table 5) as mathematically this equates to zero benefits, and even ACIL Tasman discuss quantifiable benefits	On the contrary, in fact the BCR of 0 could be considered generous given the actual outcome of the analysis for some patronage scenarios. The reason for this is that the gross benefit stream consists of the sum of consumer surplus minus forfeited producer surplus. The consumer surplus is measured by the change in the generalised cost of transport multiplied by the number of HNSLR passengers. The producer surplus forfeited equals farebox revenue minus operating cost. If the annualised operating cost is greater than the farebox revenue, there is an operating subsidy. If the subsidy is greater than the consumer surplus there will be negative gross benefits. This is the case with the 'no

Item	Feedback	Response
		sparks' patronage level. For a further discussion on the CBA approach see **Section 1.6**.
26)	It is greatly concerning that throughout the business case study ACIL Tasman relied heavily upon information sourced from DIER and Metro Tasmania and appears not to have conducted any of their own research or tested the veracity of the information provided to them. Draft stage reports contained not only serious flaws outlined above (which remained unrectified in the final version) but also worrying mistakes as to the location of stations and suburbs, but also bizarrely suggested the placement of possible transit oriented developments between an oil storage facility and a cemetery;	AECOM cannot comment on confidential material exchanged between DIER and ACIL Tasman. DIER and Metro Tasmania are in a unique position to collect, analyse and conserve material relating to this and other initiatives in the area. To collect additional primary data collection outside that available through Metro Tasmania and DIER would be of considerable expense and unlikely to be possible given the budget originally available. It should be noted the stage 3 modelling was not dependent on Metro patronage. The only potentially subjective input into the Business case was that of design of a feeder bus which was designed by DIER staff with considerable public transport planning experience. The TOD location issue has been addressed in **Section 1.3** of this report.
27)	HNSRAG contend that had the original scope been adhered to and a proper analysis of ridership, and wider benefits (including deferral of road capacity upgrades) had been performed, a BCR in excess of 2.0 could have easily been realised and would have provide a compelling basis for a funding application to Infrastructure Australia	As noted in #19, road upgrades are a separate issue and should not be confused with HNSLR. Wider benefits (without associated costs) do not form part of a conventional CBA. A BCR in excess of 2 is unheard of in public transport CBAs, even in much bigger cities with more favourable conditions for public transport mode share.

2.3 Planning Institute of Australia

Item	Feedback	Response
1)	Since the announcement of the relocation of intermodal facilities from Macquarie Point, PIA has been a strong supporter of the reuse of the current freight rail corridor for public transport purposes. Indeed, PIA along with the Australian Institute of Architects, and Housing and Community Research Unit of the University of Tasmania advocated directly to Infrastructure Australia and Federal and State Government Ministers and representatives throughout 2008 and 2009, the benefits of the use of the rail corridor for public transport purposes. As highlighted to the Advisory Committee early in the process, the business case was however restricted in its scope to the analysis of a potential light rail system along the rail corridor from Hobart CBD through to Brighton. As discussed by PIA and a number of other members of the Advisory Committee throughout the process, the restriction in scope was considered unfortunate, as other potentially less expensive public transport options for the corridor – such as a rapid bus transit system - were left uninvestigated.	The decision as to whether to investigate alternate options is outside the scope of this peer review, and would be the decision of DIER whether to pursue alternate options. It is noted that some alternate options were investigated in the Business Case Stage 1 Report, namely: - Legislative solutions. - Tidal Busway. - Road widening and de-bottlenecking. - Bus lanes and signal priority. - Emissions and congestion pricing.
2)	Secondly, PIA noted throughout the process that the business case analysis occurred in isolation of any strategic land use planning activity, which has potential to affect the medium to long term viability of public transport options along the rail corridor. As you may be aware over the past 3 years there has been significant strategic land use planning undertaken within Southern Tasmania. In October 2011 the Southern Tasmania Regional Land Use Strategy was declared by the Minister for Planning and in early 2012 a draft Capital City Plan for Greater Hobart was released for public consultation. These strategic documents specifically identify key land use planning changes that are relevant to the consideration of public transport options between Hobart and Brighton. In particular the Regional Land Use Strategy identifies land between Hobart and Glenorchy as a target for infill development opportunities, which is also reflected in the draft Capital City Plan.	The points made by PIA are valid and should be considered by DIER and the Tasmanian Government within the wider context of the strategic planning for Greater Hobart. A public transport route along the Transit Corridor of Main Road/Elizabeth Street, and not the freight line, will allow for greater capture of patrons, as it allows for greater penetration into the city and other activity nodes (as opposed to skirting the outside as the freight line does). As noted by PIA, the consideration of possible future land use changes does not align with IA guidelines. Especially when land use changes outlined are strategic aspirations rather than trends that are already occurring. Within the HNSLR Business Case some of these benefits have been captured within the non-monetised cost and benefits of the HNSLR proposal (see **Section 1.7**). It could be that further elaboration is included in these components for consideration by IA, particularly with regard to the support of the strategic intent of agglomeration and urban

Item	Feedback	Response
	In addition, in response to these 'new' strategic land use planning directions, the Department of Infrastructure, Energy and Resources, commissioned the Glenorchy to Hobart CBD Transit Corridors study which examines at a more detailed level, infill development potential along the transit corridor from Glenorchy to Hobart. The transit corridor includes the current rail corridor. This study was completed in July 2012 and recommends Main Road/Elizabeth Street should be the focus of the first transit corridor. The land use planning parameters for the business case analysis were however focused on a 'steadystate' land use situation and whether there was sufficient demand within the current land use situation. PIA submits that major infrastructure projects are rarely viable at initiation or completion and are often reliant upon long term land use change to make them viable. Clearly, there are intentions to further consider the viability of such major land use changes given the current recommendations and policies within the Regional Land Use Strategy and draft Capital City Plan. PIA also submits that it is unnecessarily conservative to require that such land use changes are already occurred or are taking place. There is sufficient evidence from across Australia, to demonstrate that the construction of key infrastructure projects, necessary to support the desired land use changes, best occurs early in the process, in order to facilitate a quicker and stronger market response to the changed land use planning situation. PIA does however acknowledge that a weakness in meeting the Infrastructure Australia submission guidelines and taking into account the future land use objectives for land surrounding the rail corridor, is the absence of any solid commitment to implementation of the objectives either through a permanent capital city strategic planning system (as well as finalisation of the Capital City Plan) or depending upon the final model, a permanent regional planning governance arrangements. Indeed implementation of the land use planning objectives at this point in time if very much reliant upon the statutory (and reactive) mechanism of local planning schemes. PIA strongly advocates that a key task for the State	consolidation. However, the low BCR indicates that the implementation of the light rail, despite these additional benefits, does come with very high risks with regard to the required public subsidy which might be required to maintain the rail line, should these additional developments not occur and that these developments do not directly translate to significant growth of patronage on the rail line. The development of four TODs (at Derwent Park, Moonah, Glenorchy and Claremont), which while not entirely appropriate in their location, were an attempt to factor in some of the additional demand that would be generated from increased densification along the rail route. Even with this higher demand, and the sensitivities that were conducted on even higher demand, it was not possible to generate a positive BCR on the proposed light rail development. For further information see the following sections: - Discussion of the use of TODs in the Business Case: See **Section 1.3.1** - Discussion of the non-monetised costs and benefits: See **Section 1.7**

Item	Feedback	Response
	Government to ensure that such projects as this are capable of meeting IA submission guidelines, is to further the capital city strategic planning reforms initiative by the Federal Government.	
3)	PIA does support in principle the re-use of the rail corridor for public transport purposes, but recommends that the most appropriate course forward is to integrate the consideration of options along the corridor into a more detail strategic planning exercise that furthers that land use planning objectives within the Regional Land Use Strategy and builds upon the recommendations within Transit Corridors study. Such a project could in fact form part of the Capital City Plan project and in doing so re-use options for the rail corridor are more likely to meet IA requirements.	This comment is valid and provides a suggestion on ways forward for re-use of the rail corridor. Further consideration on this matter would need to be undertaken by DIER, the Tasmanian Government and its associated planning bodies.

2.4 Dr Stewart Williams, University of Tasmania

Item	Feedback	Response
1)	The evaluation was based on a business case that placed emphasis on economic over social and environmental concerns such that some critically important but non-monetized factors were not included in the BCR. Oversights and/or exclusions here (identified by ACIL Tasman in their first of three reports) include social benefits of congestion alleviation; impacts on socially disadvantaged people; benefits associated with the creation of TOD areas; environmental pollution benefits; and tourism benefits.	Non-monetised costs and benefits are generally items which cannot be readily valued in monetary terms. Attempts to value these costs and benefits can involve expensive processes that yield results with very wide margins of error. Explicit recognition is thus given to non-monetised costs and benefits by describing them in qualitative terms (ATC, 2006, pp. 51, V3). As such, these non-monetised costs and benefits, do not impact on, or have any influence on, the benefit/cost ratio. However, IA nevertheless incorporates these non-monetised costs and benefits into the appraisal process and requests the proponents to provide supporting information on the scale of these impacts (Infrastructure Australia, 2012). Within the HNSLR Business Case, ACIL Tasman has provided commentary regarding these likely costs and benefits and their likely scale of impact (rated on a sale from low to high). This has been further assessed in this report in **Section 1.7**. Further studies could be funded by DIER to attempt to put some values on the identified non-monetised costs and benefits, however, it is questionable whether this would fundamentally change IA's overall assessment of the business case, given the very low BCR. IA guidelines suggest that "significant WEBs will only be found in proposals with strong traditional benefits, since WEBs require high levels of behaviour change, e.g. strong demand for the new asset". Please also see **Section 1.7** in Part One.
2)	The instrument relied on economically quantifiable data and the suggestion (proposed by CAP members) that the evaluation include at least some examples or references to more qualitative, scenario-based, sensitivity, and case-based analyses was perhaps too readily dismissed by the consultants.	The assessment of monetised costs and benefits which is applied in a "conventional" CBA methodology is only one part of the assessment of the viability and appropriateness of a project. Based on the Peer Review assessment, the inclusion of the monetised costs and benefits, and the qualitative description of the non-monetised costs and benefits were an appropriate approach to the Business Case, and this approach aligned with IA guidelines.
3)	Some values used in the evaluation were not deemed appropriate by some CAP members and by me as the chair because we believed them to	Please see #18 **Section 2.2**.

Item	Feedback	Response
	be too low, including the dollar value put on car-parking in the Greater Hobart area; and the anticipated price of transport fuel into the future.	
4)	Some values that might (and perhaps ought to) have been used in the evaluation, but were not used, include the possible cost-savings made in travel times; and the revenue from specific sectors of patronage including school children (neither were any possible links to the University of Tasmania Sustainable Transport Plan made)	Travel time savings were one of the key measures of the costs (or benefit) of the various transport options considered in the base case (i.e. no light rail) and the project case (light rail) in the HNSLR Business Case. A discussion of the review of the travel time cost and travel time savings can be found in **Section 1.4.2.1** in Part One of this report. The Peer Review found that the CBA utilised an appropriate approach to travel time savings, and in fact, did not include the time penalty for transferring from a car or bus to a train. As such, if anything, the HNSLR Business Case underestimated the travel time required when using light rail, which would further reduce the likely travel time savings patrons would get from using the light rail service. The Stage 3 Business Case Report considers patrons as undertaking either “directed trips” or “undirected trips”. Students were captured within the “directed trips” route. This consumer surplus approach utilised in the model was reviewed in **Section 1.6.1** The Peer Review assessment suggests there is considerable doubt whether HNSLR can provide the travel times and savings hypothesised given the state of the alignment and the modest construction budget.
5)	The use of the chosen instrument might also have incorporated within its economic evaluation a more sophisticated approach that would permit, in its final analysis of the business case, the inclusion of opportunity costs and trade-offs associated in making any decisions that favours one over another of the different transport infrastructure options possibly available.	The Stage 1 Report examined different options as part of a scoping exercise and to give some introduction as to why it was time to see if the rail alternative had anything to offer. It was carried out at a high level and by definition did not require the level of sophistication associated with detailed CBA or Bankability phases. The ACIL Tasman approach was fit for purpose.
6)	Other methodological concerns include the fact that the modelling was based on extant (or what might be termed ‘historic’) travel behaviour data rather than any anticipated increase in patronage that might follow provision of a totally new and alternative, passenger transport service.	Please see response to PIA’s submission – see #2 in **Section 2.3.**
7)	Likewise, the modelling did not incorporate other important factors such as the impacts on land use patterns (for example, through residential infill, TODs or other development) and subsequent change in land use and property values that might be expected to follow (and be planned for on the basis of) light rail provision.	The Stage 3 Report includes the provision of four transit orientated developments (TODs) along the light rail route, and increases patronage after the fifth year of operation to account for the increase population living close to the rail line. We have provided a review of this approach in **Section 1.3.1.** In addition, the Stage 3 Report provides commentary on the non-monetised benefits of such TODs. We have provided a review of this in **Section 1.7.2.**

Item	Feedback	Response
		It is noted that further data could be calculated which attempts to value the property value uplift which might occur due to the location of the HNSLR. However studies to date suggest this approach may have high margins of error. This additional work could be commissioned by DIER. These values however would be outside the scope of the CBA and would be included as non-monetised costs and benefits for the purposes of the economic evaluation.

2.5 Future Transport Tasmania

Additional supporting material including media releases and FTT's Submission to Legislative Council Inquiry was provided by the FTT as part of their submission. This supporting material has not been addressed in detail below, however it was used as supporting evidence as needed when addressing concerns raised by the FTT regarding the HNSLR Business Case.

Item	Feedback	Response
First Stage Report		
1)	FTT contends that no business case could be complete without acknowledgement of the costs of the key alternative, that of the Brooker Highway. However there is no mention of this within the LRBC.	CBA treats projects as standalone. The case for upgrading the Brooker Highway stands on its own merits since it has its own costs and benefits just as HNSLR does. Thus for example, a case to upgrade the Brooker Highway would not include a benefit of say $300 million to avoid implementing HNSLR. In other words, "*Costs and benefits should be compared between the world with the project and without It*" (NSW Treasury, 1997, p. 49).
2)	FTT also notes the following educational facilities within approximately 800 metres of a potential railway station and some are just beyond the 800m range but we still consider them a good potential source for patronage.	Section 5.2 of Stage 1 Report notes *"Specific student trips on school services typically undertaken by travel from residences to schools were generally excluded with the exception of those travelling to places located near the proposed HNSLR stations."* What ACIL Tasman is saying is that if people are already catching buses or walking, it is unclear that they would gain an additional benefit from walking to the train station and catching a train. In addition, the Stage 3 Business Case Report considers patrons as undertaking either "directed trips" or "undirected trips". Students within the 800m radius were captured within the "directed trips" route. The consumer surplus approach utilised in the model, which include the analysis of "directed and undirected trips" was reviewed in **Section 1.6.1,** and was found to be sound. It is also noted that some of the educational institutions noted in the submission are outside the walking distance of the proposed railway stations. Introducing additional stations to accommodate student travel would reduce benefits to other users by increasing the overall travel time of the trip.
3)	Social inclusion and access to transport	There is no doubt that the provision of public transport is an important contributor to the wellbeing of individuals and communities (Hurni, 2006). While the benefits to lower socio-economic communities from the provision of public transport are very hard to quantify, the Business Case does raise the issue in its non-monetised benefits section.

Item	Feedback	Response
		It is beyond the scope of the Business Case to find optimal way of addressing social inclusion issues in terms of maximising benefits subject to minimising cost. However, it is noted that those people north of the Claremont terminus would be serviced by higher frequency feeder bus services (see page 13 of the stage 3 report) in the HNSLR case and the frequency of such feeder bus services is well in excess of the frequency of current bus services. And the same time, it should be considered that expenditure on a light rail service may not be the most effective way of improving public transport access for socially disadvantaged residents in the northern suburbs. This is also noted in a footnote within Report 3 which acknowledges that social disadvantage could also be achieved through, *…similar high quality services that did not necessarily involve rail (Sparks Effects notwithstanding) but involved a good feeder-bus system; it is the quality, rather than the mode, which matters in the reduction of social disadvantage.*
4)	Emissions	Please see ATC National Guidelines (2006, p. 18 V 4 and p. 35 V3) for a list of items which can be included. The Business Case includes the environmental impacts in the CBA in the standard manner. This value was also revised in **Section 1.4.2** in Part One.
5)	Aging populations	It is acknowledged that the Business Case did not take into account the aging population of Hobart. This could be included in more detail within the non-monetised benefit of "benefits in terms of social disadvantage". However, it is argued that the capture of older people along the line may not be significant due to mobility issues and that alternate transport such as buses (or subsidised taxis) provide better coverage of residential areas than rail.
6)	Potential Solutions to the Transport Problem in Hobart: - Tidal Busway - Road widening and de-bottlenecking	It is noted that some alternate options were investigated in the Business Case Stage 1 Report, namely: - Legislative solutions. - Tidal Busway. - Road widening and de-bottlenecking. - Bus lanes and signal priority. - Emissions and congestion pricing. The decision as to whether to re-investigate alternate options is outside the scope of this peer review, and would be the decision of DIER whether to pursue alternate options.

Item	Feedback	Response
7)	Demand levels	As outline in Part One, it is regarded that the Business Case sufficiently compared the range of demand levels likely to occur for HNSLR. The HNSLR will operate in a fixed corridor. Unless someone's destination is on that route they will not use it no matter whether they are within 800 metres or not. Significant areas of the CBD are more than 800 metres from the proposed station. In addition, a proportion of people (which could be up to 30%) travel in the reverse direction. It seems optimistic that they use HNSLR when parking is free at the other end and there is little traffic congestion so their aggregate travel time is shorter than by HNSLR. For further discussion please see for example **Section 1.3** and **Section 1.7** in Part One
Third Stage Report		
8)	Range of patronage estimates	As outline in Part One of this report, it is regarded that the Business Case sufficiently compared the range of demand levels likely to occur for HNSLR. ACIL Tasman have provided a range of demand scenarios ranging from "no sparks" where patronage is determined by relatively simple multimodal utility functions based on the generalised cost of travel to an extreme "strong Sparks" patronage level. Demand estimation is notoriously difficult and in the past consultants have drawn considerable criticism for optimism bias in almost every transport project in Australia. The strong Sparks Effect patronage level is based on a simple multiple modelled on the Mandurah rail experience to which HNSLR bears no resemblance but is used as an upper boundary based on a particular set of favourable circumstances and first class facilities, infrastructure, operations and large population. Thus without knowing the exact nature of the Sparks Effect, the CBA in the HNSLR Business Case clearly shows that the project barely breaks even under the most optimistic patronage projections. Further, this is based on the $80 - $90 million cost structure which only offers bare-bones service and is incompatible with the conditions necessary to generate strong sparks which might require three times as much expenditure. The inevitable conclusion is that not only is the project high risk, but the negative NPV indicates the welfare of society has been made worse not better by implementing the project. To sum up, the CBA shows that on average society is better off without the project.

Item	Feedback	Response
9)	Costs We believe that the inclusion of the capital fund borrowing should be made separate to the actual running costs, as the method of funding is a decision that has yet to be made.	The source of funding is irrelevant for the CBA since regardless of the funding regime, annual budgeting must take place if only to repay loans and estimate subsidies. The method used by ACIL Tasman is to create an annuity combining operating and capital costs. This is well suited to estimating producer surplus loss but is different to the conventional approach of expensing all capital costs in year 0. However, the annuity gives the same result in a more convenient form. The method used by ACIL is acceptable except that the capital costs are far too low.
10)	Details on Demand Model The $3 per day average cost of parking has been used in the Business. Case and *"of those that do not pay for parking, many of them are walking from their place of parking, for a distance of up to 2 kilometres."* *"[T]he fuel cost is listed at $1.20 per litre."*	Modelling is about averages. There is evidence that there is a considerable amount of free parking in the Hobart CBD. The $3 value in the HNSLR is considered an appropriate average of the range of parking costs available in Greater Hobart (remembering not all trips on the HNSLR will be to the CBD), based on data provided to the Peer Review team in the unpublished *Park and Ride Community Transport Survey* (DIER, 2010a). In addition, some people park in the basement, some people walk 2 km. Equally many potential HNSLR passengers who travel to in the CBD would also walk more than the 800 metres radius. The fuel cost is only one of a large number of variables placed in the generalised cost model. High fuel prices may cause motorists to switch to public transport however, the issue is far more complex when issues such as the convenience and security of cars is traded off against longer walks in inclement weather, etc. Conventional economic appraisals are conducted in constant (real) dollars. Sometimes important inputs have price changes above the general price indices and an allowance should be made. It is noted the Business Case is limited to high level estimates of costs and benefits. But changes in energy prices will also impact directly on the HNSLR cost structure as well as on private cars. There is considerable evidence that over time peoples' valuation of time increases as shown that growth in average incomes has outstripped CPI. Thus the labour component of HNSLR will increase faster than inflation. A simplistic approach acceptable at a high level is to let these impacts cancel each other out.

Item	Feedback	Response
Final Report		
11)	*"[T]he BCR cannot be held as neither an accurate nor a clear verdict on the viability of the project"*	This is incorrect. The BCR is an ideal tool to assess project viability. Just because a project is unviable does not mean it is undesirable to the public, governments or pressure groups. A BCR less than 1.0 just means that on balance the society will be made worse of in overall terms than it the initiative had not been executed. Thus to pay for the shortfall, ceteris paribus, funding from other perhaps higher return or higher need projects must be cut.
12)	Stage 1 - significant lack of consideration of the effects of social exclusion and the benefits that could be provided to by the railway service to Bridgewater in particular.	The Stage 1 report does not dispute the existence of social disadvantage but their methodology resulted in the optimised northern terminus at Claremont, short of Bridgewater. In fact, further analysis by AECOM has suggested that the optimal northern terminus may be Glenorchy, as extending the line beyond Glenorchy would worsen the BCR, NPV and cost recovery (and hence the overall net benefit to the community) (see **Section 1.9**). The conclusion to be reached is that HNSLR is not the best way to address the problem because the incremental costs greatly exceed the incremental benefits. Importantly however, it is noted that those people north of the Claremont terminus would be serviced by higher frequency feeder bus services (see page 13 of the stage 3 report) in the HNSLR case and the frequency of such feeder bus services is well in excess of the frequency of current bus services. The patronage to be generated from these feeder bus services was included in the HNSLR patronage for the CBA. It is also noted that within the reports the improved accessibility for those living in the northern suburbs is addressed through qualitative description as a non-monetised benefit. It should be considered that expenditure on a light rail service may not be the most effective way of improving public transport access for socially disadvantaged residents in the northern suburbs.
13)	*"ACIL Tasman conclude that a positive net benefit was possible, but that it was a high risk investment. FTT contends that without consideration of the key alternative, as mentioned in our opening statement, that this conclusion is a fallacy. FTT believes that it is in fact the upgrade to the Brooker Highway that is the risky investment".*	The positive net benefit is possible if: - A Mandurah style strong sparks patronage occurs. - Costs of $80 - $90 million are firm. - There is zero cost for realignment etc. - Maximum and average speeds will double over the present corridor. - HNSLR offers service and performance quality for strong sparks at a fraction of the cost of the Perth rail service.

Item	Feedback	Response
		- Nobody will be inconvenienced at any of the 17 level crossings where boom gates will close access 8 times per hour. - The proportion of HNSLR passengers which travel in the counter direction instead of driving despite free parking and minimal traffic congestion. However, it is improbable that these set of outcomes will occur, and it is for this reason that we would consider the investment to be high risk. Note that if the true costs of HNSLR are say $300 - $400 million (as noted in Part One, **Section 1.5**), the project will not be viable, regardless of strong Sparks Effect. With regard to the Brooker Highway investment, CBA treats projects as standalone. The case for upgrading the Brooker Highway stands on its own merits since it has its own costs and benefits just as HNSLR does. Thus for example, a case to upgrade the Brooker Highway would not include a benefit of say $300 million to avoid implementing HNSLR.
14)	Letter from Anna Reynolds, Greens Candidate for the Federal Seat of Denison In addition to the FTT submission feedback outlined above, the submission also contained a letter from the Greens Candidate for the Federal Seat of Denison. The letter contains two, interrelated points which are summarised below: - "*the Business Case failed to place the Hobart Light rail project within the context of a shift to Light Rail that is occurring in many small cities in the world*". The letter provides a list of over 180 light rail projects operating and under construction in small cities, with populations of less than 500,000. - "*the Business Case work was largely silent on a number of medium term strategic issues that will drive people to public transport in Hobart - issues such as an aging population and a community that is vulnerable to small increases in oil prices*".	While there are many examples of where light rail has been implemented in large and small cities internationally and in Australia, each project must be judged on its own merits, and in the context in which they operate. Many of the light rail projects highlighted in the submission, such as those in Japan, are operating in cities with significantly higher residential densities than are in Hobart. In other cases, such as some in Germany and Switzerland, other strategic policies have been put in place to reduce car usage / increase the use of public transport, such as banning cars. There are many characteristics of urban areas that are needed to successfully encourage the use of public transport, including: - Pedestrian access to transit service has few barriers. - Optimised quality and amenity of recreational path networks. - Provision of cycle storage and change facilities at key nodes. - Safe and sheltered waiting areas. - Programs that incentivise walking and cycling. - Medium to high intensity use of the site. - Mixed uses to attract both day and evening pedestrian traffic (this includes the availability of convenience retail services). - High quality intermodal connectivity - Climate which encourages active and public transport use.

Item	Feedback	Response
		(see for example UDIA, 2012 and BCTransit, 1994). Many of the conditions do not exist within Hobart northern suburbs to a degree that would be required to greatly uplift public transport demand on HNSLR, and while some could be created, this would be at additional costs, which would need to be included in the HNSLR, and it is unlikely they would generate the additional patronage needed to offset these costs. For feedback on the impact of the light rail proposal on medium term strategic issues please see response to the Planning Institute of Australia (**Section 2.3**) as well as responses to FTT above and HNSRAG (**Section 2.2**).

2.6 Hobart City Council

Item	Feedback	Response
1)	The Council notes the contents of the Hobart to Northern Suburbs Light Rail Business Case… and strongly supports improvements to the public transport bus network across the greater Hobart Region The Council would support further investigation into the possibility of using the rail corridor for on-way peak hour bus movements, with the current rail line to be retained in the corridor for possible future light rail use. The Council also supports a major upgrading of the CBD bus terminus and in this regard believes that it should be included in any future submission to Infrastructure Australia for federal funding support.	The comment is valid and provides a further suggestion on ways forward for re-use of the rail corridor. Further consideration on this matter would need to be undertaken by DIER.
2)	…It was the view of Council Officers… that the original Business Case demonstrated clearly that a light rail connection would not be an effective use of public funds.	The comment is valid and provides a further suggestion on ways forward for re-use of the rail corridor. Further consideration on this matter would need to be undertaken by DIER.

Reference List

ACIL Tasman. (2012, October 2012). HNSLR Business Case Peer Review. (AECOM, Interviewer)

Ahern, A. a. (2009). *Searching for Sustainable Transport Policies*. Retrieved from http://intranet.imet.gr/portals/0/usefuldocuments/documents/01241.pdf

Anonymous. (2012). Perth to Mandurah Railway, Australia. *railway-technology.com*. Retrieved November 2012, from http://www.railway-technology.com/projects/perthtomundurah/

Arndt, D. (2012, September 30). Metro patronage drops in 2011-2012. *The Examiner*. Retrieved from http://www.examiner.com.au/story/367945/metro-patronage-drops-in-2011-2012/

ATC. (2006). *National Guidelines for Transport, System Management in Australia.* Australian Transport Council. Commonwealth of Australia.

Australian Government. (2012). *Gold Coast Rapid Transit – Formerly Gold Coast Light Rail (QLD). Project description. Department of Infrastructure and Transport.* Retrieved October 2012, from http://www.nationbuildingprogram.gov.au/projects/ProjectDetails

BCTransit. (1994). *Transit and Land Use Plannin.* Retrieved December 3, 2012, from http://www.bctransit.com/corporate/resources/pdf/res-urban-20.pdf

Berliner Verkehrsbetriebe . (2012). *Trams - Timetables, Routes and Maps*. Retrieved November 1st, 2012, from http://www.bvg.de/index.php/en/17106/name/Tram.html

Bitzios, D. (2008). *Measuring Benefits of the South East Busway: Towards a New Approach for Valuing Public Transport Projects* . Retrieved October 2012, from http://www.patrec.org/web_docs/atrf/papers/2009/1834_paper152-Bitzios.pdf

Davies, A. (2012, July 26). Is this rail line too good to be true? *Crikey.com*. Retrieved November 2012, from http://blogs.crikey.com.au/theurbanist/2012/07/26/is-this-too-good-to-be-true/

DIER. (2010a). *Park and Ride Community Transport Survey.* Department of Infrastructure, Energy and Resources.

DIER. (2010b). *Greater Hobart Household Travel Survey: Summary of analysis and key findings.* Department of Infrastructure, Energy and Resources.

DIER. (2011). *Congestion in Greater Hobart.* Department of Infrastructure, Energy and Resources.

Glazebrook and Associates. (2006). *City of Sydney - Review of Patronage and Revenue for the Castlereagh St Light Rail Route.* Retrieved October 2012, from http://www.cityofsydney.nsw.gov.au/aboutsydney/documents/ParkingAndTransport/LightRail/PatronageAndRevenue-FinalReport.pdf

Goldlinq. (2012). *The Tram*. Retrieved October 2012, from Goldlinq Gold Coast Light Rail: http://goldlinq.com.au/operating-light-rail/trams-and-stations/

Hegger, R. (2007). Public Transport and Cycling – Living Apart or Together? *Public Transport International Edition 2*. Retrieved December 3, 2012, from http://www.uitp.org/public-transport/urban/pics/ptcycling.pdf

Hurni, A. (2006). *Transport and Social Disadvantage in Western Sydney.* University of Western Sydney and Western Sydney Community Forum .

Infrastructure Australia. (2012). *Infrastructure Australia's Reform and Investment Framework: Guidelines for making submissions to Infrastructure Australia's Infrastructure Priority List using the Reform and Investment Framework.* Commonwealth of Australia.

Kenworthy, J. (2000). *Techniques of Urban Sustainability: Quality Transport.* Murdoch University. Retrieved October 2012, from http://www.istp.murdoch.edu.au/ISTP/casestudies/Case_Studies_Asia/qtrans/qtrans.html

Lucas, C. (2010, September 28). Dandenong Plant to build 50 trams. *The Age*. Retrieved from http://www.theage.com.au/victoria/dandenong-plant-to-build-50-trams-20100927-15u42.html#ixzz28wxon8Jx

Lucas, C. (2011). Tram jam: Melbourne's car glut puts the brakes on public transport. *The Age*. Retrieved from http://theage.drive.com.au/roads-and-traffic/tram-jam-melbournes-car-glut-puts-the-brakes-on-public-transport-20110420-1doxy.html

NSW Treasury. (1997). Guidelines for Economic Appraisal.

Queensland Government. (2011). *Cost-benefit Analysis Manual, Road Projects. Guidelines for TMR CBA tool, CBA6.* Department of Transport and Main Roads, State of Queensland.

Rail Express. (2010). *Mandurah line a clear winner.* Retrieved October 2012, from http://www.railexpress.com.au/archive/2010/october/october-20-1010/other-top-stories/mandurah-line-a-clear-winner

Railway Technical Society of Australasia. (2008). *Rail Horizons - No. 39 March 2008, retrieved October 2012, from http://rtsa.com.au/assets/2008/04/grms_rail-horizons_march_final.pdf .*

Railway Technical Society of Australia. (2008). *Rail Horizons Journal No.39.* Retrieved October 2012, from http://rtsa.com.au/assets/2008/04/grms_rail-horizons_march_final.pdf

Royal Agricultural Society of Tasmania. (2012). *Annual Report 2011/2012.* Retrieved November 2012, from http://www.hobartshowground.com.au/docs/2011-2012-rast-annual_report.pdf

Royal Agricultural Society of Tasmania. (2012). *Location*. Retrieved November 2012, from Hobart Showground: http://www.hobartshowground.com.au/location

Royal Automobile Club of Tasmania. (2012). *Royal Automobile Club of Tasmania*. Retrieved October 2012, from Fuel Watch: http://www.ract.com.au/Pages/Home.aspx

RTA. (1999). *Economic Analysis Manual.* Transport Roads and Maritime Services, New South Wales Government.

RTA. (2009). *Economic Parameters for 2009 RTA Economic Analysis Manual Appendix B.*

Sagerer, S., & Wills-Johnson, N. (2012). *A New Approach to Calculating the Benefits Associated with Infrastructure Investment.* ACIL Tasman.

Southern Tasmanian Councils Authority. (2011). *Southern Tasmania Regional Land Use Strategy 2010 - 2035.*

The State of Queensland. (2010). *Transit oriented development: guide for practitioners in Queensland.* Department of Infrastructure and Planning.

Tourism and Transport Forum Australia. (2010). *The Benefits of Light Rail.* Retrieved October 2012, from http://www.ttf.org.au/Content/lightrail.aspx

Translink. (2012). *Train Timetables*. Retrieved November 1st , 2012, from http://jp.translink.com.au/travel-information/network-information/timetables

Urban Development Institute of Australia. (2012). *Transport – Encouraging Public Transport Use and Introducing Mechanisms to Reduce Reliance on Private Cars as the Primary Mode of Transport.* Retrieved December 2012, from http://www.udiawa.com.au/go/Transport

Appendix A

Community Advisory Panel Submissions

FILE Light rail transport project
ENQUIRIES Tony McMullen
TELEPHONE (03) 6216 6323
E-MAIL *tmcmullen@gcc.tas.gov.au*

GLENORCHY CITY
Where ideas happen.

6th November 2012

Mr A Malowiecki
AECOM
Sent by email to: Andrew.Malowiecki@aecom.com

Dear Sir

Submission to Peer Review of Hobart to Northern Suburbs Light Rail Business Case

I refer to an invitation from the Minister for Sustainable Transport, Nick McKim MP, to provide comments to assist AECOM's peer review of the Business Case for the Hobart to Northern Suburbs Light Rail Project.

I am pleased to advise that Council considered the Minister's invitation at a special Council meeting on 5th November 2012 and resolved to make the following submission:

Council's Position on Public Transport

Glenorchy City Council's stated position is to support an integrated and efficient public transport system that not only meets the needs of those of its residents who are transport disadvantaged, but also presents public transport as a mainstream transport choice. The current public transport system does not meet these aspirations.

Council has previously expressed support for the Hobart to Northern Suburbs Light Rail proposal subject to its feasibility being clearly demonstrated.

2011 Business Case Conclusions

The Business Case prepared in 2011 by ACIL Tasman pointed to an $80-90 million capital cost for the project and operating costs in the order of $2.7 million and $5 million per annum (depending on the system selected and whether or not new or existing tracks are used).

The Business Case concluded that there was a positive benefit/cost ratio and that a light rail might be feasible only based on an assumption of a significant "sparks effect" i.e. high takeup of public transport patronage attracted by light rail as a transport mode.

Clearly, there is a public benefit in rigorous feasibility examination of the light rail proposal before a decision is made whether or not to commit the level of

PO Box 103
Glenorchy Tas 7010
Ph: (03) 6216 6700
Fax: (03) 6216 6400
Ausdoc DX 70721
gccmail@gcc.tas.gov.au

public resources required. The proposed peer review process is therefore strongly supported.

The following comments and suggestions as to the scope of the peer review are made:

Did the Business Case Meet the Terms of Reference and Contract Specification?

The peer review ought to ensure that the Business Case prepared by ACIL Tasman met the terms of reference for the Business Case and the contract specification for the project.

Hobart Northern Suburbs Rail Action Group

The Hobart Northern Suburbs Rail Action Group in its letter of resignation from the Community Advisory Panel identified a range of concerns with the Stage 1 Report on the Business Case which were further canvassed at a recent Special Council workshop, including:

- Flawed passenger demand analysis (i.e. underestimating likely passenger demand).
- Underestimated revenue (exclusion of some student patronage and use of a $1.50 fare box assumption).
- Limitation of the extent of the line from Hobart to Claremont only.
- Lack of recognition of the importance of formal and informal park and ride stations.
- Lack of consideration of transit oriented developments.
- A non-optimal operating service model.
- A gross underestimation of the level of public support for a light rail system.
- Unrealistically low parking and petrol price assumptions in the consultant's model.

As indicated at the Council workshop, the Action Group has been invited to make its own submission to the peer review.

Conservative Assumptions in the Business Case

On the other side, a review of the Business Case reports for Stages 1, 2 and 3 highlights a range of self-declared conservative estimates made by ACIL Tasman or its consultancy team in the body of the reports including:

- Track upgrade cost estimates
- Park and ride construction cost
- Passenger demand estimates are high and subject to some double-counting

Clearly, there is a difference in position between the Hobart Northern Suburbs Rail Action Group and the consultants who prepared the business case in relation to a number of fundamental business case elements including the optimal operating service model itself, demand, revenue and cost projections. These differences need to be tested in the peer review.

Non-monetised Costs and Benefits

There were also a range of non-monetised costs and benefits identified by the original consultancy team, including:

- Interruption to traffic at crossings (high cost)
- Transit oriented development (medium benefit)
- Social costs of congestion alleviation (medium benefit)
- Social inclusion benefit (medium benefit).

It would be useful to further explore these non-monetised costs and benefits in the peer review to consider their order of influence upon the benefit/cost ratio bottom line.

Changes in Context

Finally, there have been a range of significant changes in context since the Business Case was prepared.

Changes in Policy Context

Changes in policy context include:

- Southern Tasmania Regional Land Use Strategy 27 October 2011
- Economic Development Plan August 2011
- Regional Economic Development Plan (to be launched mid November 2012)
- Legislative Council Inquiry into Integrated Transport Options in Southern Tasmania

The Regional Land Use Strategy is important and relevant because it identifies containment of growth within an urban growth boundary and densification along high frequency public transport corridors as a key strategy. It includes the setting of growth and density targets.

The State and Regional Economic Development Plans are important and relevant because one of their core goals is to improve the social and environmental sustainability of the economy. This moves issues such as investment in public transport to a central place in the economic development of the State and region.

Changes in Underlying Conditions and Parameters

There are a number of changes in underlying conditions and parameters since the Business Case was prepared that might affect the outcomes of modelling.

These include:

- Changes in the general price level since the Business Case was prepared.
- Availability of 2011 Census data.

- Need for review of the discount rates used in the calculation of the benefit/cost ratio for their currency and appropriateness.
- Need for review of the currency of the borrowing rate for amortisation purposes.
- Additional patronage as a result of visitation to MONA significantly exceeding the 300,000 assumed on p. 29 of the Stage 1 report. (Now believed to be 400,000 or more per annum).
- Changes in bus patronage over the intervening period, including fare box revenue, patron numbers and composition.
- Increased petrol prices (the price per litre for fuel has increased significantly from the $1.20 assumed in the Business Case).

Delivery Model

There appears to be an implicit assumption that the light rail project, were it to proceed, would be wholly funded by government.

It may be beneficial to consider whether a different delivery model for the project such as a public/private partnership would have any impact on project feasibility.

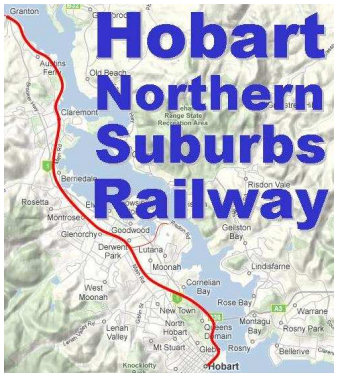
Please contact Council's Manager City Strategy, Tony McMullen, if you have any questions in relation to this matter.

Yours faithfully

Peter Brooks

General Manager

The Hobart Northern Suburbs Rail Action Group was formed to facilitate the establishment of the Hobart Northern Suburbs Passenger Rail Service and the preservation of the rail corridor between Hobart and Brighton for rail services.



Submission to the Peer Review: Hobart Northern Suburbs Light Rail Business Case

7 November 2012

Andrew Malowiecki
AECOM

Via email

Dear Andrew,

The Northern Suburbs Rail project presents an exciting opportunity for urban renewal and development in a major region of Hobart. Unfortunately the project has been assessed in a rationalist passenger transport only approach without considering the wider benefits from land use improvements and economies of agglomeration. Maintaining the rail link between Hobart and Bridgewater should have also been considered strategically by maintaining the rail freight link to the working port of Hobart and Risdon industrial precinct. Maintaining rail access to the Hobart waterfront for tourist/heritage rail operators is also an overlooked benefit given the increasing importance of the Tourism industry to the State's economy. Increasing public transport patronage could also negate more expensive capacity improvements to the parallel Brooker Hwy. Despite the single track railway, strategically located passing loops, and 2 x 3 car EMUs could move up to 1,000 people in each direction every 12 minutes: ample capacity for now and a carbon constrained future.

The Hobart Northern Suburbs Rail Action Group Inc (HNSRAG) represents the community who has driven the campaign for the reinstatement of passenger rail services in the Northern Suburbs along the existing railway line. It was the grassroots campaign and strong community support that led to tri-partisan political support for a detailed study into the northern suburbs railway in the lead up to the March 2010 State election and subsequent development of the Hobart Northern Suburbs Light Rail Business Case in 2011.

I represented the HNSRAG on the Community Advisory Panel (CAP), but sadly my initial enthusiasm quickly waned at the completion of Stage One of the Business Case as my faith in the rigour and genuineness of the Business Case was lost. After raising concerns directly, and to no avail, with the CAP, the Department of Infrastructure, Energy and Resources (DIER), and the Minister's office, the HNSRAG had no option but to resign from the CAP as the group did not want to be party to or sanction a process that ignored our input and did not want to see rail 'stack up'.

As feared, the flawed assumptions and predictions made in the Stage One Report snowballed and considerably impacted on the validity of the Stage Two and Stage Three Reports. At a public meeting on 14 September 2011, the HNSRAG presented the findings of the Business Case. Those at the meeting were unanimous in their disbelief and outcry over the study inputs and consequent findings and called on the State Government to listen to the community and rectify the numerous flaws with the business case.

In the document "*Case for the Hobart & Northern Suburbs Railway*" (Attached) the HNSRAG outlines and discusses the key failures and flaws of the Business Case at each stage of the process. They are summarised below:

Stage One Report Issues:

- Likely rail ridership was assumed to be equivalent to existing public transport ridership along the route. This is not comparable or indicative of what ridership could be achieved with a faster and more frequent public transport option which in some instances (eg. Brighton-Hobart) reduces existing public transport transit times by almost 70%;
- Modelling a best case scenario of 15% walk-on ridership is not generous nor a comparable percentage with other cities. ACIL Tasman confused the public transport patronage percentage of an entire city with that of the public transport patronage percentage in an 800m radius of a station. Whilst across the entire city of Sydney there may be 15% public transport patronage, that patronage increases significantly in proximity of rail stations;
- Failure to include purpose designed feeder bus services and the impact that they would have on encouraging multi-modal, integrated public transport journeys and ultimately through good integrated service coverage a shift from private transport;
- No acknowledgement that once established it was likely that the areas around the stations would experience significant growth both in residential terms but also business and that as a result more trip generating factors would emerge;
- Failed to properly consider and account for the "spark effect" associated with rail in the face of clear evidence that integrating existing public transport networks with rail acts itself as an attractor and in some cases can almost quadruple patronage along the same corridor;
- Limited formal and informal park 'n' ride to just one facility/station. Most stations on the railway have existing (informal) parking available and several stations have considerable scope for expansion of parking facilities. Park 'n' ride is highly successful at most rail stations on mainland Australia;
- Failed to properly consider "kiss n ride" as a ridership option, again contrary to rail experience in other jurisdictions;
- Excluded or limited student patronage numbers on the basis that to include it would be "likely to reduce the overall viability of the LRS", which defies logic;
- Failed to consider existing road traffic as an indicator of likely demand and opportunity for modal shift, particularly as the railway line parallels the two most congested arterials in Tasmania (Brooker Hwy and Main Road).

Stage Two Report Issues:

- Limiting the study scope between Hobart and Claremont resulted in a non-optimal operating model with irregular section lengths between passing loops stations.[1] This yielded delays and increased transit times.[2] Modelling subcontractors, Plateway, expressed concerns to me that the rail model was inefficient (non-optimal).

[1] Alternatively, Hobart-Granton conveniently sectionalises into 4 similar length track sections with passing loop stations at activity centres at New Town, Glenorchy, and Claremont.

[2] Single track sections with passing loops is not unusual for intensive commuter rail operations, indeed the Johnsonville line in Wellington (NZ) is analogous and operates over four single track sections with passing loops on the same 1067 mm track gauge.

- Increased journey times had a detrimental compounding effect of reducing likely patronage and thus undermining overall benefits
- Future expansion beyond a Claremont terminus would likely require costly relocation of existing passing loops stations; and
- Concluded the entire track is not suitable for passenger trains based on a very brief inspection and track condition reports that pre-dated major track upgrade works including rail and sleeper replacements undertaken in the latter half of 2011.[3]
- Annualised rail maintenance costs are considered excessive given the 15 km of railway would be managed and maintained within TasRail's asset portfolio. The maintenance cost should also be apportioned to all rail users including freight and tourist rail operators.

Stage Three Report Issues:

- Monetised benefits appear to be underrepresented and based on a flawed demand analysis adopted in Stage One and inadequate travel time savings promulgated in Stage Two;
- Wider economic benefits (economies of agglomeration) attributable to Transit Oriented Developments and Urban Renewal are not considered;
- ACIL Tasman's Stage Three Report lacks numerical data substantiating the value attributed to each quantifiable/monetised benefit;
- No sensitivity analysis around flawed inputs into the consumer surplus demand modelling such as cost of parking in Hobart at a mere $3 per day (when it is a minimum of $10) and an average fuel price of $1.20 per litre which cannot be substantiated; and
- Little attempt to estimate or quantify/monetise benefits which should have been included. For instance it should have been possible to attribute a quantifiable value to land use integration within the transport network (value capture) and to consider the savings from negating the need for alternatives such as capacity upgrades on the parallel Brooker Hwy (approx. $238 million: Hobart-Berriedale, approx. $1 billion: Hobart-Bridgewater[4])
- Benefits such as the amelioration of the social costs of congestion and social exclusion, the reduction of environmental pollution, and boost to tourism were not quantified yet should have been;
- Tourism (non-commuter) ridership and benefits have likely been underestimated or ignored (as they are not quantified). For example, the Royal Agricultural Society of Tasmania has advised the HNSRAG that annual visitations to the Hobart Showgrounds are approx. 500,000 per annum. Other 'non-commuter' ridership apparently not considered includes the, KGV sports/community precinct, Tasmanian Hockey Centre, and Runnymede;
- Failure to quantify the benefits of providing a fully accessible (DDA Compliant) public transport option to those who currently cannot access public transport (wheelchair, scooter or pram users);

[3] The track was regularly used by heritage passenger trains until 2005 when post 9/11 insurance issues contributed to the of cessation of passenger rail access

[4] Tasmanian Government's 2011 Submission to Infrastructure Australia

- Failure to quantify the improved operating efficiencies that an integrated public transport would reap through reduced operational and labour costs to Metro Tasmania (as recognised in DIERs Main Road Transit Corridor Project);
- With regard to the "spark effect" (the phenomenon of significant increases in patronage directly attributable to a more attractive rail option) ACIL Tasman were "agnostic" about its existence even in the face of firm evidence that it exist and can be quantified specific to Australia's most recent metropolitan rail expansion with the Mandurah Line in Perth, WA. In the Summary Report they pay mere lip service to its impact on passenger demand and ultimately the BCR.

Summary Report Issues:

- It is absurd to document a BCR of 0.0 (Table 5) as mathematically this equates to zero benefits, and even ACIL Tasman discuss quantifiable benefits;
- it is greatly concerning that throughout the business case study ACIL Tasman relied heavily upon information sourced from DIER and Metro Tasmania and appears not to have conducted any of their own research or tested the veracity of the information provided to them. Draft stage reports contained not only serious flaws outlined above (which remained unrectified in the final version) but also worrying mistakes as to the location of stations and suburbs, but also bizarrely suggested the placement of possible transit oriented developments between an oil storage facility and a cemetery;
- HNSRAG contend that had the original scope been adhered to and a proper analysis of ridership, and wider benefits (including deferral of road capacity upgrades) had been performed, a BCR in excess of 2.0 could have easily been realised and would have provide a compelling basis for a funding application to Infrastructure Australia.

In reading each of the reports and the minutes of the Community Advisory Panel, it is apparent that ACIL Tasman relied heavily upon data provided to them by DIER and Metro Tasmania. The HNSRAG submit that reliance on this data significantly limits the validity of any assumptions based upon them. As an example, patronage demand was determined primarily on current ridership data for a very inefficient, unattractive, and unpopular public transport option when it would have been more appropriate to conduct a stated preference survey. Furthermore, we submit that DIER have not been forthcoming with details on alternative options (including plans, costings and benefit cost ratios) for road upgrades along the Brooker Highway and Main Road Corridor (the two main parallel corridors). We fear that with DIER project managing the Business Case, and now the Review, that unless AECOM undertake to independently verify data, and where it is found to be deficient collect data, that the issues with likely demand modelling and consequent direct and indirect benefits will remain.

The HNSRAG respectfully request that the Review consider all the issues raised above and in the attached "*Case for the Hobart & Northern Suburbs Railway*". We would welcome the opportunity to discuss this further with you and ask that you do not hesitate to contact us.

Yours sincerely,

Ben Johnston BEng(Hons) GradIEAust MAIPM MIET

President, Hobart Northern Suburbs Rail Action Group

Planning Institute Australia
Tasmanian Division

C/- PO Box 5427
Kingston ACT 2604

Telephone: (02) 6262 5933
Facsimile: (02) 6262 9970
Email: tas@planning.org.au
Web: www.planning.org.au

ABN: 34 151 601 937

9 November 2012

Mr Andrew Malowiecki
AECOM
Level 8, 540 Wickham Street
FORTITUDE VALLEY QLD 4006

via email - Andrew.Malowiecki@aecom.com

Dear Andrew

We write in regards to the invitation from the Minister for Sustainable Transport, the Hon. Nick McKim MP to make a submission in regards to your peer review of the Hobart to Northern Suburbs Light Rail Business Case.

There are two key issues which the Planning Institute of Australia, Tasmanian Division (PIA) wish to raise in regards to the business case prepared by ACIL-Tasman Ltd and the associated consultants brief.

Since the announcement of the relocation of intermodal facilities from Macquarie Point, PIA has been a strong supporter of the reuse of the current freight rail corridor for public transport purposes. Indeed, PIA along with the Australian Institute of Architects, and Housing and Community Research Unit of the University of Tasmania advocated directly to Infrastructure Australia and Federal and State Government Ministers and representatives throughout 2008 and 2009, the benefits of the use of the rail corridor for public transport purposes.

As highlighted to the Advisory Committee early in the process, the business case was however restricted in its scope to the analysis of a potential light rail system along the rail corridor from Hobart CBD through to Brighton. As discussed by PIA and a number of other members of the Advisory Committee throughout the process, the restriction in scope was considered unfortunate, as other potentially less expensive public transport options for the corridor – such as a rapid bus transit system - were left uninvestigated.

Secondly, PIA noted throughout the process that the business case analysis occurred in isolation of any strategic land use planning activity, which has potential to affect the medium to long term viability of public transport options along the rail corridor.

As you may be aware over the past 3 years there has been significant strategic land use planning undertaken within Southern Tasmania. In October 2011 the Southern Tasmania Regional Land Use Strategy was declared by the Minister for Planning and in early 2012 a draft Capital City Plan for Greater Hobart was released for public consultation. These strategic documents specifically identify key land use planning changes that are relevant to the consideration of public transport options between Hobart and Brighton. In particular the Regional Land Use Strategy identifies land between Hobart and Glenorchy as a target for infill development opportunities, which is also reflected in the draft Capital City Plan.

In addition, in response to these 'new' strategic land use planning directions, the Department of Infrastructure, Energy and Resources, commissioned the *Glenorchy to Hobart CBD Transit Corridors study* which examines at a more detailed level, infill development potential along the transit corridor from Glenorchy to Hobart. The transit corridor includes the current rail corridor. This study was completed in July 2012 and recommends Main Road/Elizabeth Street should be the focus of the first transit corridor.

The land use planning parameters for the business case analysis were however focused on a 'steady-state' land use situation and whether there was sufficient demand within the current land use situation. PIA submits that major infrastructure projects are rarely viable at initiation or completion and are often reliant upon long term land use change to make them viable. Clearly, there are intentions to further consider the viability of such major land use changes given the current recommendations and policies within the Regional Land Use Strategy and draft Capital City Plan. PIA also submits that it is unnecessarily conservative to require that such land use changes are already occurred or are taking place. There is sufficient evidence from across Australia, to demonstrate that the construction of key infrastructure projects, necessary to support the desired land use changes, best occurs early in the process, in order to facilitate a quicker and stronger market response to the changed land use planning situation.

PIA does however acknowledge that a weakness in meeting the Infrastructure Australia submission guidelines and taking into account the future land use objectives for land surrounding the rail corridor, is the absence of any solid commitment to implementation of the objectives either through a permanent capital city strategic planning system (as well as finalisation of the Capital City Plan) or depending upon the final model, a permanent regional planning governance arrangements. Indeed implementation of the land use planning objectives at this point in time if very much reliant upon the statutory (and reactive) mechanism of local planning schemes. PIA strongly advocates that a key task for the State Government to ensure that such projects as this are capable of meeting IA submission guidelines, is to further the capital city strategic planning reforms initiative by the Federal Government.

In summary, PIA does support in principle the re-use of the rail corridor for public transport purposes, but recommends that the most appropriate course forward is to integrate the consideration of options along the corridor into a more detail strategic planning exercise that furthers that land use planning objectives within the Regional Land Use Strategy and builds upon the recommendations within Transit Corridors study. Such a project could in fact form part of the Capital City Plan project and in doing so re-use options for the rail corridor are more likely to meet IA requirements.
PIA thanks the Minister for the opportunity to provide comment to you on this matter. We look forward to your consideration and the release of the Peer Review in December.

Yours sincerely,

Mat Clark
State President
Planning Institute of Australia Tasmanian Division

Private Bag 78 Hobart
Tasmania Australia 7001
Phone (03) 6226 2463 Fax (03) 6226 2989
email Secretary@geog.utas.edu.au

SCHOOL OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

UTAS

Dr Stewart Williams
School of Geography and Environmental Studies
University of Tasmania, Hobart, TAS 7001
Stewart.Williams@utas.edu.au

Mr Andrew Malowiecki
AECOM Australia/New Zealand Office, Brisbane, QLD 4000
Andrew.Malowiecki@aecom.com

Dear Andrew

RE: Peer Review of the Hobart to Northern Suburbs Light Rail Business Case

Please accept this submission made to you in your capacity as peer reviewer of the Hobart to Northern Suburbs Light Rail (HNSLR) Business Case for the Tasmanian state government. I was privileged to chair the Community Advisory Panel (CAP) for the HNSLR Business Case and my comments pertain to my being in that invited role between 2010 and 2011.

I will make three introductory comments before then providing a series of dot points highlighting what I believe to have been some of the main weakness in the HNSLR Business Case.

First, please note that the project was put out to tender by the state government's Department of Infrastructure, Energy and Resources (DIER). I participated with DIER staff in the awarding of this independent consultancy which was won on merit and subsequently conducted by a team led by ACIL Tasman. It was closely supervised by senior staff, a project manager and a team of support staff all from DIER.

Second, as chair of the CAP, and in light of the state funds invested, I worked closely with DIER as well in trying to ensure that all CAP members and their diverse views and inputs were included in the process. Ultimately, though, I gave priority to avoiding possible destabilisation of the process and our working towards the attainment of an outcome that was satisfactory within the constraints of the evaluation process. In that respect, I did sign off the HNSLR Business Case to satisfactory completion with DIER for the state government's consideration.

Third, I have held that the methodology was reasonably robust in terms of what it did select to include for measurement in the HNSLR Business Case through its choice and subsequent use of a Benefit-Cost Ratio (BCR) as the preferred instrument of evaluation. However, there were several issues raised in relation to the use of this instrument that some of the CAP members and me as chair felt were problematic:

- The evaluation was based on a business case that placed emphasis on economic over social and environmental concerns such that some critically important but non-monetized factors were not included in the BCR.
- Oversights and/or exclusions here (identified by ACIL Tasman in their first of three reports) include social benefits of congestion alleviation; impacts on socially disadvantaged people; benefits associated with the creation of TOD areas; environmental pollution benefits; and tourism benefits.
- The instrument relied on economically quantifiable data and the suggestion (proposed by CAP members) that the evaluation include at least some examples or references to more qualitative, scenario-based, sensitivity, and case-based analyses was perhaps too readily dismissed by the consultants.
- Some values used in the evaluation were not deemed appropriate by some CAP members and by me as the chair because we believed them to be too low, including the dollar value put on car-parking in the Greater Hobart area; and the anticipated price of transport fuel into the future.
- Some values that might (and perhaps ought to) have been used in the evaluation, but were not used, include the possible cost-savings made in travel times; and the revenue from specific sectors of patronage including school children (neither were any possible links to the University of Tasmania Sustainable Transport Plan made).
- The use of the chosen instrument might also have incorporated within its economic evaluation a more sophisticated approach that would permit, in its final analysis of the business case, the inclusion of opportunity costs and trade-offs associated in making any decisions that favours one over another of the different transport infrastructure options possibly available.
- Other methodological concerns include the fact that the modelling was based on extant (or what might be termed 'historic') travel behaviour data rather than any anticipated increase in patronage that might follow provision of a totally new and alternative, passenger transport service.
- Likewise, the modelling did not incorporate other important factors such as the impacts on land use patterns (for example, through residential infill, TODs or other development) and subsequent change in land use and property values that might be expected to follow (and be planned for on the basis of) light rail provision.

The above points comprise some of my main concerns about the HNSLR Business Case based on my role as CAP chair and recall of the process and its details. Other CAP members will provide you with valuable comments, explanations and data beyond my reach and full understanding, and I trust that you will incorporate them into your peer review. Indeed, my last comment (whilst probably outside your remit here) is that the invited expertise, insight and opinions of CAP members were not always accommodated in this process.

I thank you again for conducting this peer review and look forward to your findings.

Stewart Williams

9 November 2012

FUTURE TRANSPORT TASMANIA

FOR BETTER PUBLIC & RAIL TRANSPORT

Submission to AECOM

Light Rail Business Case Review

Below is Future Transport Tasmania's (FTT) submission to your review of the Light Rail Business Case (LRBC). As you would know, FTT was a member of the Community Advisory Panel for the LRBC. FTT has previously expressed concerns regarding not the process through which the report was conceived, but rather certain conditions, values and attributes of the business case itself. The greatest of these is that the Business Case was not weighed against the key alternative option, that of a program of upgrades to the main arterial road through Hobart's Northern Suburbs, the Brooker Highway. FTT believes that it must be assumed that if the rail service was not introduced, that construction of upgrades to the Brooker Highway would occur instead.

Our submission will focus on certain key points drawn from all sections of the LRBC. We will review each section in order, highlighting the specific issues we have identified.

First Stage Report

As indicated in the final summary, the primary aim of the business case was to 'explore the case for light rail and the effectiveness of that solution for solving the transport problems of the Northern Suburbs and between the CBD.' FTT contends that no business case could be complete without acknowledgement of the costs of the key alternative, that of the Brooker Highway. However there is no mention of this within the LRBC.

The transport problem in Hobart (page 7)

It is worth highlighting that the only data relating to congestion available to ACIL Tasman was from 2006. FTT submits that there is little likelihood that this has decreased, and acknowledgement of this should be made. FTT also believes that whilst by comparison to mainland cities reveals that congestion is not as severe in Hobart, the level of congestion for the size of the city is concerning.

The report also refers to a significant portion of travel east-west to various schools in the Northern Suburbs, and states that the Northern Suburbs Light Railway (NSLR) is not adjacent to many schools. FTT does not discount the amount of east-west traffic, but would like to point out that whilst there is no existing rail service, it is impossible to expect travel patterns to follow it. FTT also notes the following educational facilities within approximately 800 metres of a potential railway station:

University of Tasmania Centre for the Arts (Hunter Street) Hobart
Tasmanian Polytechnic, Campbell Street Hobart
New Town High School

Glenorchy Primary School
Rosetta High School and Rosetta Primary School
Claremont High School
Claremont Primary School
Holy Rosary School, Wyndham Road Claremont
St Virgils College Austins Ferry

Some are just beyond the 800m range but we still consider them a good potential source for patronage, including:

Ogilvie High School New Town
Cosgrove High School Glenorchy
Claremont Academy

Social inclusion and access to transport (page 10)

FTT does not dispute the information regarding social inclusion. Rather we believe the issue has not been given sufficient weight. Recently we made a submission to the Tasmanian Legislative Council inquiry. Below is our statement on social inclusion.

Transport planning and infrastructure in Tasmania largely ignores the 'mobility' and 'spatial' issues relating to low socioeconomic communities. A lack of adequate public transport significantly impacts on these communities' opportunities to access to activities, resources and support that are readily available to others living within the metropolitan area of Hobart. The current transport networks operating within and outside of the greater Hobart area are permeating a culture of social exclusion.

Research indicates that social exclusion from public transport has a significant impact on young people, the old, the poor, the physically handicapped and the sick. There are links between transport disadvantage and a wide range of adverse health outcomes, including mental illness, suicide and general poor health. Additionally, such lack of transport access inhibits individuals' access to education, training and work opportunities with consequent adverse implications for such individuals' ability to improve their own economic situation.

Social exclusion, from a transport perspective, continues to be a major social problem worldwide, particularly in urban fringe and rural areas, resulting in isolation, lost work opportunities and health issues, including mental illnesses and medical disorders. These are the barriers facing many individuals living outside or the metropolitan areas of Hobart, where bus services are limited. Introducing reliable and economically affordable transport alternatives to communities living in lower socio economical areas of the greater Hobart area would offer significant opportunities for the access to basic health, employment and educational opportunities which are readily available to individuals in similar circumstances, but are living in suburbs around and within the Hobart area with access to public buses.

FTT notes that a number of suburbs that are regarded as transport disadvantaged are in the northern suburbs of Hobart. If the Northern Suburbs Railway was to be implemented only to Claremont, a number of transport disadvantaged suburbs would be left with no improvement to services. Considering the above points, FTT regards this as a serious deficiency.

Emissions (page 14)
FTT notes that whilst the emissions saved may not appear significant, without the NSLR there is virtually no chance of reducing transport based CO2 emissions in Tasmania.

Ageing population (page 15)
FTT notes that whilst it may be true that a transport system designed for commuters is not necessarily able to cater for the needs of pensioners and disabled people, FTT believes that the NSLR is more able to fit their needs than the current bus services.

Potential Solutions to the Transport Problem in Hobart

Tidal busway (page 20)

Some time ago a tidal busway was suggested to replace Hobart's railway line, where buses could jump onto an isolated road that would replace the railway line, and enjoy a speedy trip into the city.

On the surface such an idea has its attractions. Buses are a flexible means of providing public transport and routes could be easily altered to enable such a service to work. A busway would ensure that buses are not hampered by the congestion of private cars on the Main Road and Brooker Highway.

The trouble is that such a busway has been costed at nearly $50 million greater than using the railway line, just to put the platforms and concrete down; -never mind the additional buses and drivers that would be required to ensure its success. Furthermore a busway which can only travel in one direction is in fact quite inflexible -a breakdown or a crash in the wrong place could result in the entire route being jammed up in minutes.

If the busway operated over the current railway route then every crossing with ordinary roads would generate more congestion than a rail service, due to the greater number of buses that would be required to carry passengers compared to a rail vehicle.

The busway would also destroy any chance of passenger rail or freight into Hobart, including tourist operations. It has been suggested that the busway could operate over the top of the rail tracks, or that the concrete could be poured around the existing tracks. From an engineering point of view this is completely unfeasible and impractical. Use of the railway could not ever be considered in conjunction with a busway. If the tracks were to remain in situ with a concrete base, this would mean ensuring a heavy rail capacity is retained on a tramway style formation that was scarcely used. The cost of this would be far greater than the busway as costed in the Pitt & Sherry report.

FTT also contends that buses are fundamentally unpopular as a potential alternative (in Hobart, at least) and whilst there may be some additional users the amount would be insufficient to justify the expenditure. Rail (of all kinds) has a much greater attractant capability than any bus services.

Road widening and de-bottlenecking (page 23)
FTT notes that despite the fact that DIER did not provide any information on the cost of improvements to the Brooker Highway, these costings were revealed only a few months later in a preliminary submission to Infrastructure Australia.

The costs of improvements to the Brooker were as follows:
Goodwood and Elwick Road: $53 million
Risdon Road to Domain Highway: $150 million
Other costs: $10

At this time, there has been no net-cost benefit study towards these proposals. FTT agrees with the ACIL Tasman assessment that these proposals can only influence congestion. However, FTT contends that these improvements will in fact only serve to shift congestion rather than remove in. Our research has found that adding highway lanes does little or nothing to address congestion problems.
(http://www.ptua.org.au/myths/congestion.shtml)
(http://bicycleuniverse.info/transpo/roadbuilding-futility.html)
ACIL Tasman notes these issues also. FTT believes that because this proposal was not costed (at the time), the net-cost benefit ratio of the LRBC was not valid. This is because if the NSLR project does not proceed, clearly the only likely alternative is the Brooker Highway upgrade.
FTT contends that this issue is critical to the LRBC and believes that it is the Brooker Highway proposal that carries a far greater risk. This is due to the fact (as highlighted by ACIL Tasman) that it does not deliver nearly as many outcomes or options as the NSLR.

Background to the rail solution

Likely demand levels (page 28)
Like the Hobart Northern Suburbs Rail Action Group (HNSRAG), we dispute the likely demand levels. The figures in the stage one report are based (amongst other things) on a level of up to 15% walk-on ridership within a range of 800m from stations. We are given to understand that this is based on public transport patronage from mainland cities. However, this figure is the overall average patronage, not the level that could be expected from within 800m of railway stations or light rail stops in mainland cities. We believe that in order to generate 15% total public transport patronage, up to 50% or more of residents could be expected to use public transport from within the 800m zone.

Second Stage Report

FTT understands that AECOM will be reviewing the economic business case rather than the costings and Optimal Operating Service Models as developed for ACIL Tasman by Hyder Consulting.

Third Stage Report

Executive summary

FTT finds it strange that ACIL Tasman acknowledge the ability of rail to attract a larger share of public transport patronage than other modes, but then claim to have limited understanding of it. Because of this, they then include no less than eight possibilities of increasing and decreasing patronage with no sparks effect. This seems to be deliberately highlighting a negative outlook with no evidence then provided for such a negative result.
The benefit cost ratios as included by ACIL Tasman are also not listed with any caveat for the significant number of non-monetized benefits.

Costs

The project is stated as costing between $12.6 and $13.3 million per annum, based on a 7 per cent loan and additional rolling stock purchases. This figure does not provide an accurate picture of the actual cost of operating the system, which according to the Stage 2 report is actually just over $2.5 million per annum, plus the maintenance costs of a similar level. Therefore the annual cost is actually more like $5 million per annum.

We believe that the inclusion of the capital fund borrowing should be made separate to the actual running costs, as the method of funding is a decision that has yet to be made.

Details on Demand Model

FTT wishes to highlight the following flaws in the demand model, as listed in the Appendix of the Stage 3 report.

The parking cost is listed as $3 dollars per day, which is an average, due to the fact that many people do not pay for parking in Hobart. However, out of those that do not pay for parking, many of them are walking from their place of parking, for a distance of up to 2 kilometres. This should be factored in to the model. FTT is not aware of anyone paying for parking less than $8 per day (the majority pay more). Furthermore, the fact that some employees receive free parking should not be discounted, as this is still a cost, even if transport users are not bearing it directly.

As has been highlighted elsewhere, the fuel cost is listed at $1.20 per litre. The retail fuel price in Hobart at the time of the study was much higher (from $1.32 up to $1.48), and is currently $1.50 per litre for unleaded petrol. The price of car registration has also (following the LRBC) been increased.

Final Report

Executive summary

ACIL Tasman believes the overall conclusions from the project were reasonably clear. However this goes against a BCR which did not include several benefits that they could not adequately or confidently measure. It also featured travel demands that included unrealistically low travel costs (parking and fuel) also noted that they were 'agnostic' regarding the existence of the sparks effect, despite the fact that there is more than sufficient evidence to support it. Therefore on this alone the BCR cannot be held as neither an accurate nor a clear verdict on the viability of the project.

The first stage of the project which determined that the last three stations on the line were not viable is also questionable, given the clear lack of correlation between the potential patronage given and the population in the surrounding region. There is also a significant lack of consideration of the effects of social exclusion and the benefits that could be provided to by the railway service to Bridgewater in particular. Bridgewater and Gagebrook (Herdsmans Cove) are amongst the most transport disadvantaged suburbs in the Greater Hobart region. There is also some doubt over the required level of upgrade for the railway line in question. This could have a significant impact on the costs required for these sections.

ACIL Tasman also state that in the final stage of the project that the value of the subsidy that the rail service would require would outweigh the value of the community benefits by a

considerable margin. However they then go on to admit that they have calculated the possibility of a sparks effect, even though they do not believe it exists.

ACIL Tasman conclude that a positive net benefit was possible, but that it was a high risk investment. FTT contends that without consideration of the key alternative, as mentioned in our opening statement, that this conclusion is a fallacy. FTT believes that it is in fact the upgrade to the Brooker Highway that is the risky investment, as it cannot provide any of the following:

1. Reduction in private car use or car dependence
2. Reduction in Tasmania's economic oil price vulnerability
3. Guarantee on return of investment
4. Increased modal choice for transport users

In addition the Brooker Highway upgrade cannot provide any certainty for other perceived benefits. The following are likely to be slight benefits only or merely extra costs:

1. Congestion reduction (subjective and dubious value)
2. Bus service patronage may decrease in real terms
3. Increased carbon emissions from increased car use
4. Increased highway maintenance costs
5. Increased heavy vehicle use

FTT therefore is of the strong opinion that the greater risk is to not proceed with the project. To do so guarantees that none of the benefits will transpire, but that all of the negatives will occur, probably to a higher level. This is because the available alternatives to achieve the same effect on transport congestion and disadvantage in the Northern Suburbs will cost much more.

Toby Rowallan
Secretary
Future Transport Tasmania
www.futuretransporttas.org
info@futuretransporttas.org
0418 997 069

ANNA REYNOLDS.

THE GREENS Tasmania

7 November 2012

I am writing to provide input to the Review of the Business Case that was undertaken for the Northern Suburbs Light Rail Project. I understand that the reviewer AECOM is only accepting input via the Community Advisory Panel, which is why I am sending this submission to you.

I believe that the Business Case work was largely silent on a number of medium term strategic issues that will drive people to public transport in Hobart - issues such as an aging population and a community that is vulnerable to small increases in oil prices.

It is also clear that the Business Case failed to place the Hobart Light rail project within the context of a shift to Light Rail that is occurring in many small cities around the world. It would have been instructive for State Government decision-makers to understand a range of case studies of where light rail has recently been developed. Looking at existing projects would have allowed the business case to make conclusions based on some of the lessons learned from recent light rail developments.

I would like to see AECOM consider a few practical examples of light rail developments in small cities as part of its testing of the negative assumptions in the Business Case. To assist this, I draw AECOM's attention to over 180 light rail projects operating and under construction in small cities, with populations of less than 500,000.

Please note that while the majority of these are small cities, in a couple of the cases, the population indicated refers to administrative or 'catchment' areas rather than the metropolitan totals (e.g. Miami, St Louis, and Liverpool have metro areas with excess of 1 million people).

Japan

- Fukui[25] – Fukui Railway (Interurban streetcar) **(pop: 267,428)**
- Hakodate – Hakodate City Transportation Bureau[26] (tramway) **(pop: 279,851)**
- Kamakura, Fujisawa – Enoshima Electric Railway (light rail) **(pop: 174,412)**
- Kōchi – Tosa Electric Railway (tramway) **(pop: 340,515)**
- Matsuyama – Iyo Railway (tramway) **(*no population found*. Tourist hotspot)**
- Ōtsu – Keishin Line, Ishiyama Sakamoto Line (Interurban light rail) operated by Keihan Electric Railway **(Pop: 338,629)**
- Toyama **(pop:417,324,)**

  Toyama City Line (tramway) operated by Toyama Chihō Railway

  Toyama Light Rail (from 29 April 2006)
- Toyohashi – Toyohashi City Line (tramway) operated by Toyohashi Railroad **(pop:383,691)**
- Toshima, Tokyo (proposed) **(pop: 370,000)**

GREENS CANDIDATE DENISON

PHONE: 0423 222 149
EMAIL: anna.reynolds@tas.greens.org.au
WEB: www.tas.greens.org.au/denison

facebook.com/AnnaReynoldsForDenison
twitter.com/@AnnaReyno

Authorised by Philip Cocker, 208 Elizabeth Street, Hobart

Kazakhstan

- Temirtau – tram **(pop: 169,590)**

New Zealand

- Wellington (pop: 200,000) **-** Integrated rail, bus, and ferry network

Austria

- Gmunden (Gmunden Tramway), Gmunden-Vorchdorf, Vorchdorf-Lambach, Lambach-Haag, Vöcklamarkt-Attersee **(pop: 13,202** (as of 2004)**)**
- Graz **(pop: 291,890)**
- Innsbruck **(pop: 117,915** (as of 2007)**)**
- Linz, Linz–Pöstlingberg, Linz-Waizenkirchen **(pop: 191,107)**
- Salzburg (**Pop: 148,078)**

Belarus

- Mazyr **(pop: 111,770** (as of 2004))
- Novopolotsk (**pop: 107,458)**
- Vitebsk (**pop: 342,381**(as 0f 2004))

Belgium

- Charleroi - Charleroi Tram (**pop: 201,593)**
- Ghent - Ghent Tram (**pop: 240,191)**

Czech Republic

- Liberec **(pop:150,000)**
- Most-Litvínov **(pop:67,189)**
- Olomouc (**pop: 102,000)**
- Ostrava (**pop: 310 464)**
- Plzeň (**pop: 172,932)**

Denmark

- Aarhus - Decision made to build a tramway - Aarhus Letbane (**pop: 315,193)**
- Odense - Planned tramway (**pop: 191,610)**

Estonia

- Tallinn - Tallinn tram **(pop: 417,741)**

France

- Angers - Tramway d'Angers **(pop:147,305)**
- Grenoble – Tramway de Grenoble (**pop: 156,659)**
- Le Mans[31] – Tramway du Mans (pop: 148,169)
- Lyon – Tramways in Lyon (**POP: 483,181)**
- Montpellier – Tramway de Montpellier **(pop: 255,080)**
- Mulhouse – Tramway de Mulhouse **(pop: 110,514**(as of 2006))
- Orléans – Tramway d'Orléans (**pop: 153,490)**
- Reims – Tramway de Reims (**pop: 188,078)**
- Saint-Etienne – Tramway de Saint-Etienne (**pop:178,530**(as of 2001))
- Strasbourg – Tramways in Strasbourg (**pop: 272,975** (as of 2006))
- Valenciennes – Tramway de Valenciennes (**pop: 41,278,(**as of 1999))

Germany

(German light rail:)

- Baden-Baden, Heilbronn, Karlsruhe, Pforzheim (linked as *Stadtbahn Karlsruhe/Karlsruher Modell*) (**POP: 54,461)**
- Bielefeld – Bielefeld Stadtbahn (**pop: 323,395)**
- Bochum, Duisburg, Düsseldorf, Dortmund, Essen, Gelsenkirchen, Herne, Krefeld, Mülheim an der Ruhr (linked as *Stadtbahn Rhein-Ruhr*) – Verkehrsverbund Rhein-Ruhr (**pop:373,976)**
- Bonn, Cologne (Köln), Siegburg (linked as *Stadtbahn Köln/Bonn*) – Cologne Stadtbahn **(pop: 327,913)**
- Jena (**pop: 105,463)**
- Kassel (**pop: 196,526)**
- Karlsruhe - Karlsruhe Stadtbahn (**pop: 297,488)**
- Saarbrücken (**pop: 176,135)**

(German tram)

- Bad Schandau – Kirnitzschtalbahn (**pop: 4,009)**
- Bochum (**pop: 373,976)**
- Bonn (**pop: 327,913)**
- Braunschweig - Braunschweiger Verkehrs-AG (**pop: 250,556)**
- Darmstadt (**pop: 149,052)**
- Duisburg (**pop: 488,005)**
- Freiburg im Breisgau – Freiburger Verkehrs AG **(pop: 229,144)**
- Gelsenkirchen (**pop: 256,652)**
- Gotha (**pop: 45,564)**
- Halle (**pop: 233,705)**
- Herne (**pop: 164,244)**
- Kassel (**pop: 196,526)**
- Karlsruhe (**pop: 297,488)**
- Mainz (**pop: 200,957)**

- Mannheim (**pop: 314,931)**
- Mülheim an der Ruhr (**pop: 167,156)**
- Oberhausen (**pop: 212,568)**
- Plauen (**pop: 65,738)**
- Potsdam (**pop: 158,902)**
- Rostock **(pop: 204,260)**
- Schöneiche (**pop: 12,217)**
- Schwerin **(pop: 95,300)**
- Strausberg (**pop: 26,156)**
- Ulm **(pop: 123,672**)
- Würzburg **(pop: 133,808)**
- Zwickau (**pop: 93,128)**

Hungary

- Debrecen – tram lines operated by DKV (**pop: 208,016)**
- Miskolc – tram lines operated by MVK Rt. **(pop: 168,075)**
- Szeged – tram lines operated by SzKT (**pop: 170,285)**

Italy

Light rail transit systems in Italy (July 2006)

- Bergamo (**pop: 121,316)**
- Cagliari (**pop: 156,560**)
- Firenze (**pop: 370,702)**
- L'Aquila (*projected Translohr-type*) (**pop: 73,150)**
- Messina (**pop: 241,310)**
- Padova (Translohr-type) (**pop: 214,125)**
- Sassari (**pop: 130,656)**
- Trieste – Opicina Tramway (**pop: 205,374)**
- Venezia (*Translohr-type under construction*) (**pop: 270,660)**

Latvia

- Daugavpils – Daugavpils Tramway (**pop: 101,057)**
- Liepaja – Liepājas tramvajs (**pop: 82,386)**

Norway

- Bergen – Bergen's Electric Tramway & Bergen Light Rail, see Bergen Tramway **(pop: 267,100)**

Poland

- Bydgoszcz - city trams (**pop: 363,926**)
- Częstochowa - city trams (**pop: 240,027)**

- Elbląg - city trams **(pop: 127,055)**
- Gdańsk - city trams **(pop: 460 276)**
- Gorzów Wielkopolski - city trams **(pop: 125,149)**
- Grudziądz - city trams**(pop: 96,042)**
- Olsztyn - (*projected*) **(pop: 175,420)**
- Toruń **(pop: 205,934**)

Portugal

Light rail

- Costa da Caparica–Transpraia **(pop: 11,707**(as of 2001))
- Porto – Metro do Porto and STCP heritage tram system **(pop: 237,584)**

Additional rail plans in course for

- Coimbra (pop: 237,584)
- Braga (pop: 175,063)
- Faro (pop: 64 560)

Romania

- Arad **(pop: 147,992)**
- Botoşani **(pop: 100,899)**
- Brăila **(pop: 168,389)**
- Cluj-Napoca – RATUC **(pop: 309,136**)
- Craiova **(pop: 243,765**)
- Galaţi **(pop: 231,204)**
- Iaşi – RATP **(pop: 263,410)**
- Oradea – OTL **(pop: 206,231)**
- Reşiţa **(Pop: 86,383** (as of 2006))
- Ploieşti **(pop: 197,542)**
- Sibiu **(pop: 155,000)**
- Timişoara **(pop: 303,708)**

Spain

- Alicante – Alicante Tram (Ferrocarrils de la Generalitat Valenciana) **(pop: 334,329)**
- Bilbao – EuskoTran **(pop: 353,187)**
- Granada (*under construction*) **(pop: 237,929)**
- Jaén **(pop: 120,021)** (tram stopped service within 2 weeks of opening)
- Murcia **(pop: 442,573)**
- Parla (A municipality of the Madrid Metropolitan Area) – Tranvía de Parla **(pop: 120,182)**
- Santa Cruz de Tenerife – Tenerife Tram**(pop: 222,417)**
- Sóller – Puerto de Sóller **(pop: 14,000)**
- Vitoria-Gasteiz **(pop: 238,247)**

- Vélez-Málaga (**pop: 74,190)**

Slovakia

- Bratislava (**since 1895)**
- Košice (**pop: 240,688**)
- Poprad-Štrbské Pleso (Tatra Electric Railway) (**pop: 55,042)**
- Štrba-Štrbské Pleso (Štrbské Pleso – Štrba rack railway) **(pop: 3,640)**
- Trenčianska Teplá-Trenčianske Teplice**(pop: 4035)**

Sweden

- Lidingö – Lidingöbanan (**Pop: 31,561)**
- Malmö – *heritage tramway (**pop:** **303,873)***
- Norrköping – Norrköping tramway (**pop: 87,247)**

Switzerland

- Basel (**pop: 170,635)**
- Bern (**pop: 125,681)**
- Geneva (**pop: 192,385)**
- Lausanne — Lausanne Metro (light rail) (**pop: 129,383)**
- Zürich (**pop: 376,008)**

Ukraine

- Avdiivka (**pop: 37,237)**
- Chernivtsi (**pop: 240,600** (as of 2001))
- Dniprodzerzhynsk (**pop: 252,100)**
- Druzhkivka (**pop: 64,557)**
- Horlivka (**pop: 289,872)**
- Konotop, the smallest town with a stand-alone tram (**pop: 93,671)**
- Kostiantynivka (**pop: 94,886)**
- Kramatorsk (**pop: 173,700)**
- Makiivka (**pop: 389,589** (as of 2004))
- Vinnytsia (**pop: 370,100)**
- Yenakiieve (**pop: 104,000)**
- Zhytomyr (**pop: 277,900)**

UK

- Blackpool – Blackpool tramway (**pop: 142,100)**
- Newcastle upon Tyne – Tyne and Wear Metro (**pop: 280,200)**
- Nottingham – Nottingham Express Transit (**Pop: 305,700**)
- Southport - Southport Pier Tramway (**pop: 90,336)**

Proposed light rail system developments UK

- Belfast – future EWAY, WWAY, CITI, SupeRoute (**pop: 267,500)**
- Liverpool - Merseytram **(pop: 466,400)**
- Bishop's Stortford - Bishop's Stortford Ultra Light Railway (**pop: 34,826)**
- Southampton & Portsmouth - Solent Metro in the Urban South Hampshire (**pop: 239,700)**
- Preston - Red Scar area tram (**pop: 114,300)**

North America

- Cleveland, Ohio – RTA Blue and Green Lines **(pop: 393,806)**
- Morgantown, West Virginia- Morgantown Personal Rapid Transit (**pop: 30,293)**
- Newark, New Jersey – Newark Light Rail **(pop: 277,140)**
- Oceanside, California – SPRINTER (**pop: 183,095)**
- Sacramento, California – Sacramento Regional Transit Light Rail (**pop: 472,178)**
- St. Louis, Missouri – St. Louis MetroLink (**pop: 318,069)**

Proposed light rail developments USA

- Arlington, Virginia – Columbia Pike Transit Alternative **(pop: 332,969)**
- Atlanta, Georgia – Atlanta Inner Core Transit Feasibility Study, Atlanta Streetcar, Belt Line **(pop: 416,474)**
- Bangor, Maine – Bangor to Trenton Transportation Alternatives Study **(pop: 31,473)**
    - (To access the transport alternatives study for this area, go to: http://www.maine.gov/mdot/planningstudies/documents/pdf/bangor-trenton.pdf)
- Boise, Idaho – Capital City Development Corp. (City of Boise)[41] **(pop: 212,983)**
- Charleston, South Carolina – Charleston Area Regional Transportation Authority **(pop: 120,083)**
- Corpus Christi, Texas – Corpus Christi Regional Transportation Authority **(pop: 305,215)**
- Grand Canyon, Arizona – Grand Canyon Transit **(pop: 1,987)**
- Huntsville, Alabama[44] **(pop: 340,111)**
- Kansas City, Missouri – Heartland Light Rail System **(pop: 459,787)**
- Lansing, Michigan[45] **(pop: 114,297)**
- Madison, Wisconsin – Transport 2020 **(pop: 233,209)**
- Miami, Florida – Trafficrelief (People's Transportation Plan) **(pop: 408,568)**
- Oakland, California - Oakland Streetcar Plan **(pop: 390,724)**
- Omaha, Nebraska - Omaha Modern-streetcar System **(pop: 408,958)**
- Pasadena, California – Greater Pasadena Regional Trolley **(pop: 137,122)**
- Richmond, Virginia – GRTC Transit System **(pop: 204,214)**
- Rochester, New York – Rochester Rail Transit Committee **(pop: 210,565)**

- St. Louis, Missouri - Delmar Loop Trolley **(pop: 318,069)**
- Salt Lake City, Utah – Sugar House Streetcar **(pop: 186,440)**
- San Bernardino, California – San Bernardino-Redlands light rail **(pop: 209,924)**
- Spokane, Washington – Spokane Regional Light Rail **(pop: 208,916)**
- Tampa, Florida – Hillsborough Area Regional Transit Authority (HART) **(pop: 335,709)**

- Tempe, Arizona - Modern-streetcar line[49] **(pop: 161,719)**

Australia

- Canberra (pop 367,000). In light of recent elections, it is now expected that the A.C. T. Government will proceed with a $600m plan for light rail from the city to its northern suburbs.

I trust that the Review of the Business Case recognises that there are a range of strategic issues and trends that were largely missing from the original study. I also trust that the review will draw upon the vast number of case studies of light rail projects operating in small cities around the world to provide a bigger context for the decision-makers to draw upon.

Yours sincerely,

Anna Reynolds
Greens Candidate for the Federal Seat of Denison

cc. Mayor, Hobart City Council
Mayor, Glenorchy City Council
Mayor, Brighton Council
Dr. Stewart Williams
Minister Nick McKim

LORD MAYOR'S OFFICE
TOWN HALL
MACQUARIE STREET
HOBART
TASMANIA

Mr Andrew Malowiecki
AECOM

Via Email: andrew.malowiecki@aecom.com

Dear Mr Malowiecki

On 19 October 2012, the Minister for Sustainable Transport wrote to the Lord Mayor of the Hobart City Council, inviting a written submission from Council be provided to AECOM.

Given the tight timeframe for a written response, it has not been possible to obtain a formal position from the Council on this matter.

The Hobart City Council did however consider the original business case report prepared by ACIL Tasman, on the "Hobart to Northern Suburbs Light Rail Business Case" at its meeting of 12 December 2011. The Council resolved:

> *"That the Lord Mayor be requested to write to the Minister for Sustainable Transport and Alternative Energy, advising in the following terms:-*
>
> *(i) The Council notes the contents of the Hobart to Northern Suburbs Light Rail Business Case, marked as Attachment 2 to item 11 of the Open Infrastructure Services Committee agenda of 23 November 2011, and strongly supports improvements to the public transport bus network across the greater Hobart Region.*
>
> *(ii) The Council would support further investigation into the possibility of using the rail corridor for one-way peak hour bus movements, with the current rail line to be retained in the corridor for possible future light rail use.*
>
> *(iii) The Council also supports a major upgrading of the CBD bus terminus and in this regard believes that it should be included in any future submission to Infrastructure Australia for federal funding support."*

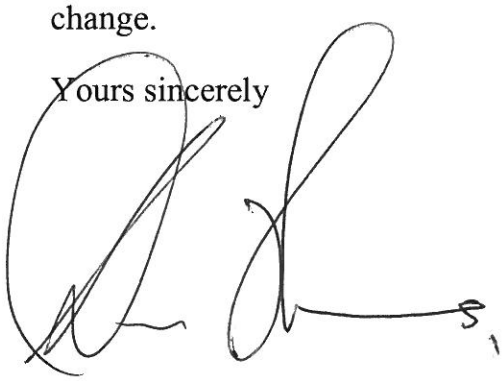
Cont…/

This is the current Council position on this matter.

A Council Officer was involved, as a part of the steering committee, in the preparation of the original business case.

It was the view of Council Officers at the time that the original Business Case demonstrated clearly that a light rail connection would not be an effective use of public funds. Council officers do however welcome the review of the Business Case and obviously subject to its findings the official position may change.

Yours sincerely



Alderman Damon Thomas
LORD MAYOR

Monday 12 November 2012