HUNTER TRANSPORT for BUSINESS DEVELOPMENT

Brad Hazzard
Minister for Planning & Infrastructure
GPO Box 39
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NSW 2001

Dear Mr Hazzard

RE: Light Rail alternative for Newcastle

Thankyou for the opportunity to meet with you recently and to make a submission on the transport problem in Newcastle. We will be making a submission on the Renew Newcastle SEPP by April 5.

Background

Hunter Transport for Business Development (HTBD) is a not for profit organisation of professionals working for some years to promote the best public transport configurations for Newcastle and the Lower Hunter.

In 2009 HTBD prepared a detailed submission to the then Labor Government when that government was proposing to cut the Newcastle rail line.

HTBD welcomes the Revitalising Newcastle SEPP as an important step forward in the rejuvenation of Newcastle.

Essentially HTBD agrees with the main thrust of the SEPP with one important exception – the decision to cut the railway and build a new terminal at Wickham. If implemented this will be a severe setback for public transport and the users of public transport in Newcastle and the Hunter.

We well understand the issues involved and are confident there is a better solution to the Newcastle rail dilemma than cutting the rail, building a new terminal at Wickham and forcing everyone onto buses.

We are confident that all the objectives of the SEPP to renew Newcastle can be achieved by terminating the heavy rail vehicles at Hamilton and utilising the existing rail tracks to run light rail vehicles to Newcastle Station with a seamless cross platform transfer at an enlarged Hamilton Station.

Modern light rail helps to renew cities

The modern tram revolution is sweeping Europe and elsewhere. Across Europe trams are making a comeback as an agent of urban renewal and as the spine of modern and revitalised public transport networks. France best epitomises the modern tram revolution with impressive new systems in cities like Bordeaux, Grenoble, Lyon and Strasbourg. In France modern new tram systems present opportunities to not only refashion existing public transport networks but to refashion the city centres themselves. This is exactly what we need to do to the Newcastle CBD.

We even have similar success stories here in Australia. Some years ago the old railway to St Kilda in Melbourne was converted to light rail and now the No 96 tram is one of Melbourne's' most popular tourist attractions taking passengers from the CBD to the famous St Kilda foreshore on Port Phillip Bay. The popular Sydney Light Rail linking Central railway with Darling Harbour and Lilyfield largely runs along an old heavy rail line and which is currently being extended to Leichardt and Dulwich Hill.

In 2007 the famous Glenelg tram was extended through Adelaide's CBD proving to be a huge success. The extended tram line has proved instrumental in revitalizing a rundown part of the Adelaide CBD and now the South Australian Government has extended the tram to the Adelaide Entertainment Centre. Ultimately it will be extended to Port Adelaide.

The extension of the Adelaide tram is a perfect example of how light rail can rejuvenate a city like Newcastle.

Our proposal

We propose that the existing Hamilton station, (which already operates as an interchange for passengers between Sydney and the Upper Hunter), be expanded to four platforms, at least, to become the heavy rail terminus. The un-used freight corridor adjacent to the existing rail corridor at Hamilton Station could be utilised to build the extra platforms and stable rail trains as required.

The existing rail corridor between Hamilton and Newcastle would become an exclusive light rail or tram line. The existing level crossings would be controlled by traffic lights and the corridor landscaped to allow 'at grade' pedestrian crossings at appropriate locations. All the additional crossings, as proposed in the Revitalising Newcastle Plan, could be provided as proposed. Five light rail vehicles will operate a shuttle service between Newcastle and Hamilton with a seamless change between heavy and light rail at Hamilton Station.

Our proposal will not require the construction of a new terminal at Wickham and will provide a direct rail service into Newcastle, while improving the connectivity between Hunter St, the CBD and the Honeysuckle precinct. The importance of a direct rail services to Newcastle is that it maintains accessibility to the CBD and its development for passengers from Maitland, the Upper Hunter and West Lake Macquarie and Sydney. The greater increase in journey time under the Wickham terminal option will deter people from using public transport.

We know that the proposed Wickham terminal option will cost between $379m and $500m according to the AECOM report. Because the Hamilton to Newcastle light rail option entails less construction , no land acquisition and no rail removal/remediation costs, it will be cheaper than the Wickham terminal option, whatever that cost may prove to be.

Light Rail Discussion paper

We have commissioned a Discussion Paper to examine the feasibility of introducing light rail to the Hamilton to Newcastle corridor – see attached.

In summary it is considered that the light rail proposal could be introduced for a cost in the vicinity of $210m.

The Discussion Paper examines the potential for some development on surplus rail corridor land which could help to offset the costs of introducing light rail to Newcastle.

It is considered that the Newcastle community may be amenable to some restricted development of surplus rail corridor land if it means that the rail service into Newcastle is retained. To keep faith with the community the light rail service would need to be introduced PRIOR to the sale and development of that surplus rail corridor land.

HTBD does not necessarily endorse everything in the Discussion paper however we consider it a very useful indication of what could be possible if light rail was to be implemented.

Consensus for light rail

In 2009 HTBD prepared a submission to government detailing a proposed Tram Train network between Newcastle, Maitland the University and Fassifern.

That submission is on the following website – www.newcastledeservesbetter.com

A petition supporting the proposal is available on the website with more than 500 signatures. Since that time there has been a steady interest in light rail as the preferred alternative to cutting the rail and forcing travellers onto buses at Wickham.
Refer to articles in the Newcastle Herald in 2010 by [redacted] and a recent article by [redacted]

In February 2010 HTBD published our "Plan B" – which called for the termination of the heavy rail at Hamilton and an introduction of an exclusive light rail services to Newcastle. The plan included our initial and indicative costings which, in all probability, will be cheaper than the construction of a new terminal at Wickham.
Also in 2010 GPT (who own a significant development site in the Newcastle CBD) admitted that they would support light rail if that was the chosen option – see article attached. There is a continuing discussion about light rail in Newcastle - see other recent articles in the local press promoting light rail.

The perfect win/win solution to a divisive issue

The Newcastle and Lower Hunter community are split on the proposal to cut the rail at Wickham and forcing passengers on buses. Clearly a **compromise solution** is required and light rail is that compromise - but it must be implemented now – not some vague promise in the future. We know from experience that once a rail line is closed it will never be re-opened, no matter what the politicians might say.

The light rail option, with a seamless change of mode at Hamilton will maintain rail services into Newcastle, while opening up access to Honeysuckle and eliminating the level crossings. Given the option most Novocastrians will support light rail and **we know that GPT agree with light rail** (see Newcastle Herald 10/6/10 attached) and we know that the State Government has light rail expertise at its fingertips.

It is the perfect win/win solution to the Newcastle rail dilemma.

Summary and conclusion

There are a number of important advantages of introducing light rail to the Newcastle to Hamilton corridor:

1) *GPT supports light rail*
   In 2010 the GPT chief executive Michael Cameron backed light rail as a suitable replacement for the inner-city heavy rail line – see article attached.

The introduction of an exclusive light rail service between Hamilton and Newcastle will allow the much needed GPT development in the Newcastle CBD to proceed. A condition of the GPT consent could be to require GPT to lease a small number of light rail vehicles with the service to commence before their development can begin construction.

2) *Allows removal of level crossings*
With the introduction of an exclusive light rail service the existing level crossings could be replaced by traffic lights and additional crossings can be installed at Steel St and Worth Place, as proposed in the SEPP, so increasing connectivity within the CBD.

3) *Light rail will stimulate renewal of the CBD*
The introduction of light rail will stimulate the renewal of the Newcastle CBD by removing the barrier between Honeysuckle and Hunter St. Light rail has a proven track record in the revitalisation of CBDs just like Newcastle. The light rail vehicles could be leased to reduce the up front cost. Extra tram stops between Hamilton and Newcastle could be constructed by the private sector provided the 'air rights' over the tram stops were made available to the developers.

4) *Government now has light rail expertise available*
In March 2012 the State Government announced the purchase of Metro Transport Sydney who own and operate the existing Sydney light rail line from Central to Lilyfield This purchase will allow the State Government to expand the light rail network in Sydney. One little understood advantage of this purchase is that it now means that the State Government has light rail expertise available to advise, design, construct and manage the proposed light rail service between Hamilton and Newcastle.

5) *Could be stage 1 of a larger light rail network*
The proposed Hamilton to Newcastle exclusive light rail service could be the start of a larger network connecting Newcastle to the University and later to Maitland and Fassifern utilising tram trains, a growing feature of light rail in Europe.

We are confident that all the objectives of the SEPP to renew Newcastle can be achieved, at a lower cost than building a new terminal at Wickham, by terminating the heavy rail at Hamilton and turning the Hamilton to Newcastle line into a light rail or tram line with a seamless change at an enlarged Hamilton railway station. If the current proposal to cut the line at Wickham includes the purchase of additional buses, as has been suggested, then the cost savings of a light rail option increases as the purchase of the additional buses may equate to the purchase/lease of the light rail vehicles, be they new or refurbished.

Any objective assessment comparing the Wickham terminal option with the light rail option will come down in favour of light rail because:

- **It will be less expensive**
- **It will achieve all the objectives of the Renew Newcastle SEPP at lower cost**
- **It will increase connectivity between the CBD and Honeysuckle**
- **It will maintain the rail service into Newcastle, albeit in a different format**

- **It will allow the GPT development to go ahead**
- **Will provide for future growth and will provide for the proposed University City Campus and court precinct**
- **It will eliminate the level crossings at Railway St, Stewart Ave and Merewether St**
- **Will help to ameliorate future road traffic gridlock**
- **Will not require the closure of Railway or Beaumont Streets**
- **Will allow the removal of the fences and allow pedestrians to safely cross the corridor**
- **Can proceed without waiting for the Western Freight bypass**
- **It will have the support of a majority of residents**
- **Will provide the basis for a future light rail service to the University and possibly John Hunter Hospital**

Light rail is the common sense, rational and cost effective compromise solution and must be adopted **now** – **before** increasing residential densities demand it – **not after** – that's simply good planning.

We strongly recommend that your team, together with the Department of Transport, which is investigating the feasibility of cutting the rail at Wickham, consider the light rail option as an alternative, as a matter of priority.

Further, we strongly recommend that you commission a feasibility into light rail in Newcastle possibly utilising information from the feasibility prepared for the Dulwich Hill light rail extension in Sydney.

As mentioned at our recent meeting it is a very serious move to truncate a rail line and we want to demonstrate how this can be avoided, while simultaneously improving north / south connectivity between the inner city and the foreshore and importantly retaining a virtually direct East/ West accessibility through to Newcastle Station for the main users of the line ,people from Maitland ,Upper Hunter, Lake Macquarie , Central Coast and Sydney.

In addition it opens up very significant opportunities for development not previously discussed. As [redacted] said in a recent Sydney Forum, public transport provides the accessibility to cities and developments in them that enables those cities and developments to work. Rail is the best people mover by far and will enhance the success of all developments but particularly the City Campus transporting thousands of students and the new court precinct at Civic station.

You will note that this proposal opens up significant opportunities for development at Newcastle , Wickham and Hamilton, while retaining rail access to Newcastle Station which we submit will significantly enhance the success of those developments by making them more accessible to customers, than would the Wickham Terminal Proposal.

We are gravely concerned that large numbers of commuters will not accept the relatively long increase in journey time required by the Wickham Terminal option which will require transfer to buses and will attempt to drive instead. Gridlock is already predicted by 2016 and will be exacerbated by this option and the large number of additional buses.

All of this seriously militates against the success of an otherwise promising Urban Renewal Strategy.

We will be making a separate submission on the Urban Renewal Strategy by 5th April 2013.

We understand that you will be discussing our light rail proposal with appropriate officers from the Department of Transport. Could we suggest a meeting with us soon after Easter to explain our material in detail.

We will forward hard copies of the submission next week including all attachments.

We could possibly arrange for [redacted] to come to Australia for discussions if that would assist.

Thank you for this opportunity to submit this 'win/win" compromise which we suggest will meet the wishes of most Newcastle residents, facilitate development ,while retaining the direct rail services to Newcastle Station which will enhance those developments envisaged in the Urban Renewal Scheme and enable this city to work for the benefit of all.

We would appreciate the opportunity to discuss this matter in more detail.

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22 March 2013

WHO WE ARE

HTBD is a not for profit organisation of independent professionals, which includes an urban planner and professional economist, whose special area is transport and development economics. None of us is acting for clients, employers, or any other person or organisation in this rail/development issue and we do not stand to gain financially from the rail staying or going, nor from any development proceeding or not proceeding.

We are vitally interested in doing what we can to ensure that Newcastle and the Hunter has the best transport configuration to meet business development, and community needs for at least the next 50 years.

Refer to this website for our 2009 submission: www.newcastledeservesbetter.com

Attachments

- Discussion Paper – Rationale for Hamilton Transit Interchange
- Photo of European tram train
- European trams
- What trams can do for cities
- Where trams go business follows
- Adelaide tram extension
- GPT article in Newcastle Herald – June 2010
- Other recent Newcastle Herald articles

Discussion Paper

Rationale for a Hamilton Transit Interchange

The Two Sides of Transport Access in the Newcastle CBD

Parts of Newcastle East and the Civic already experience parking congestion, discouraging mid-day retail traffic, and the traffic intersections of Stewart Avenue with Hunter and King Streets are regularly gridlocked at the peak of the morning commute. Projections of congestion have revealed that if the CBD and Foreshore precincts grow in pace with expected growth in the Lower Hunter, the area will experience traffic gridlock and severe parking congestion before the end of the current decade (Bizios 2010). Note that the Bizios report predicts traffic gridlock by 2016.

To sustain higher value development in the Foreshore and traditional CBD, and for private development to fully benefit from such projects as establishment of a Newcastle University CBD campus and law court precinct, it is necessary to increase public transport mode share during the morning and evening peak, so that increased residential traffic and the daily flow of thousands of University students into and out of these precincts does not interfere with property development for professional, retail and other commercial uses.

On the other hand, a number of property owners with specific properties to the south of the railway corridor feel that greater access to the Foreshore precinct across the railway corridor will increase the value of their property, which is a strategic part of laying the foundation for a property boom in these precincts.

The most direct way to accomplish more development by terminating the rail corridor and rail somewhere west of the Civic Precinct and replace that service with buses from that point east, would lead to traffic congestion and parking congestion that would make it unfeasible to sustain a property boom. In particular, serious study of the traffic and parking options facing these precincts reveals that a West Wickham Terminal Station would increase gridlock at Stewart Avenue intersections not least because of station traffic.

For best transport access to these precincts, a transport plan would upgrade and build upon the existing rail service. It would mitigate cross-corridor access with additional level crossings, for mixed traffic, to ease the Stewart Avenue gridlock and for pedestrian access further east, and might also include elevated pedestrian promenades for additional cross corridor access.

If the decision is made to place a priority on ground level access across the rail corridor in the Civic and Newcastle East precincts, then the new transport system should be compatible with high capacity and frequent transport from the rail terminus to these

precincts, in order to be compatible with more property development across the precinct than the West Wickham Terminus option.

The transport system that can meet this goal is a Hamilton Station heavy rail terminus with a cross-platform transfer to a Newcastle CBD light rail service, operating in the existing rail corridor. This is the option described in this proposal.

Hamilton Transit Interchange and Newcastle East Light Rail Transport (LRT) Proposal

Contents

1. Newcastle East LRT Service

The Newcastle CBD corridor presently hosts heavy rail passenger service east of the point where the Hunter and the Lake Macquarie / Central Coast lines merge. It has three of the top five morning commute destination stations in the Lower Hunter: Hamilton, Civic and Newcastle East.

The proposed Newcastle East Light Rail Transport (LRT) service will serve five LRT platforms: (1) the heavy rail terminus at Hamilton Station , (2) a new Wickham West platform, (3) a platform at Civic station , (4) a new Newcastle West platform and (5) a platform at the western end of Newcastle Station. It will leave Hamilton Station after receiving passengers transferring from an inbound heavy rail service, run eight minutes to Newcastle Station, than after a one minute wait returning eight minutes to Hamilton Station.

If there is an LRT waiting at the platform when it returns, and there is a sufficient service interval for inbound heavy passenger trains, the LRT waiting at platform leaves and the outbound LRT takes its place waiting for the next inbound train. When train arrivals are less frequent during the day, the LRT vehicles are dispatched from Hamilton to maintain platform waits of ten minutes or less.

Serving an upgraded set of Lower Hunter regional rail services, operating on 15 minute clock face schedules during the commuter peak, requires a minimum of three light rail vehicles, which is sufficient to support seven to eight minute frequency operation through the CBD throughout the day. Maitland Express trains at the height of the peak can generate patronage in excess of the 180 seated and standing passengers of a 32m Light Rail vehicle, which justifies rotating an additional LRV into service, with the overnight LRV rotated out for cleaning at the end of the peak. This proposal therefore calls for a purchase of five light rail vehicles to allow for a peak of four in operation and a spare.

The conversion of the CBD rail corridor to a LRT corridor supports a range of useful modifications:

- Conversion of traffic gates to light controlled intersections, with traffic signals switching from red to green as soon as the LRT is detected as clearing the intersection;
- Adding traffic crossings north of Steel Street and at Worth Place, to ease the gridlock at Stewart Avenue with both Hunter and King Streets;
- Traffic crossing connecting Darby Street to the Foreshore district;
- Converting the line voltage to 800volts, allowing the electrification across from Queens Wharf to be provided by tram wire supported by simple poles rather than the large and ugly variable tension stanchions;
- Light controlled pedestrian crossings between the Hunter Street Mall and Queens Wharf, north of the River Walk, and at the locations of present pedestrian bridges;

- and Opening up platform access to reduce the effective distance between platform and CBD destination.

2. Adaptive Re-Use of Existing Infrastructure

The route from Hamilton Station to Newcastle Station is a two track corridor that has recently undergone its major maintenance. The purchase of light rail vehicles with a wheel profile suitable for the existing track would allow existing track to be used as is, without any change in status requiring extensive work along the corridor, nor bearing any risk of expensive environmental remediation.

This plan continues to use the two highest traffic morning commute destination stations in the CBD corridor. It replaces the common Wickham / Newcastle West station with a West Wickham light rail platform and a Newcastle West light rail platform.

Use of existing rail platforms requires a run of about 23m at a 4% gradient to bring the LRV up to the platform height. This may be done with prefabricated light rail platform track sections that sit on top of newly installed footings and the existing heavy rail track. The Civic Station sections provide a gradient on each ends, with a level platform track section long enough for two light rail vehicles coupled together. The western ends of the platforms are opened up to connect by sidewalk to the new Worth Place crossing and the eastern ends to connect to Merewether Street.

The current heavy rail Platform 1 at Newcastle Station is divided into two Light Rail platform bays 1 (west) and 2 (east). If the western bay 1 is unoccupied, the light rail vehicle is switched into that bay, otherwise it continues on to bay 2. If both bays are occupied, the light rail vehicle is switched onto the third track, which is retained for stabling.

These two automated switches support all operations required at the Newcastle Station side of the system, so all of the existing heavy rail switches in the Newcastle Station stabling area may be locked out of use. With traffic gates replaced by automatic light signals, the Signal House together with the stabling lines, and current Platforms 2, 3 and 4 are all released from use and available for redevelopment, pedestrian transit, and parking.

The two new platforms are low light rail platforms placed in front of a level crossing: Railway Street for the Wickham platform and Steel Street to Honeysuckle Drive for the Newcastle West platform. As the LRV arrives at the platform, it trips the yellow traffic signal, and then the red light when the caution period has elapsed. When the vehicle has cleared the intersection, the traffic signal returns to green.

For crossing Stewart Avenue, inbound from Railway Street or outbound from Steel Street, the departure from the platform triggers the yellow traffic signal on Stewart

Avenue. After the yellow signal period elapses, the LRV has a green signal and the traffic a red signal until the LRV has cleared the intersection.

3. Complementary Airspace Development of the Corridor

The Duponts (2004) study of the opportunities for sale of property along the Newcastle Corridor showed that the primary opportunities for development lay at Newcastle Station, with secondary development opportunities at Hamilton Station.

This study did not consider the disposal of the portion of the railway corridor allocated to working rail corridor, as the government policy of the time called for reserving the this portion of the corridor for future transport-related use. It also did not consider airspace development of this transport corridor, which becomes possible with an all-electric transport service, such as light rail, operating along the corridor.

More recently, AECOM Australia completed its Newcastle City Center Renewal Transport Management and Accessibility Plan (TMAP 2010), with public transport use increasing from a 2013 projection of 15.1% without action to 15.7% as a result of the plan. AECOM projects that a 0.8% loss in public transport use due to the closure of the rail corridor at Wickham, so that without closure of the rail line, the TMAP plan would achieve 16.5% public transport use: a gain of 1.4% rather than a gain of 0.6%. Over half of the benefit of the TMAP plan is lost due to the closure of the rail corridor at Wickham.

The critical issue, therefore, is how much public transport mode share is required in order to sustain substantial ongoing property development in the Newcastle City Centre. If substantial ongoing property development can be sustained, there are substantial opportunities to leverage the Railcorp property into substantial development opportunities.

Fortunately, the Newcastle City Council commissioned the Newcastle City Centre Traffic and Transport Study (Bizios 2010), in which a transport micro-simulation was performed of the impact upon traffic congestion of development of the Newcastle City Centre.

This study substantially clarifies the interaction between public transport capacity and opportunities for property development in the Newcastle City Centre. To support the optimistic City Center Plan targets, by 2031 public transport, walking and cycling would need to increase from the current 19% of peak traffic to 54%. Under the more modest scenario in which City Centre growth tracks the current trend of growth in the Lower Hunter, 2031 public transport, walking and cycling would need to increase to 39%.

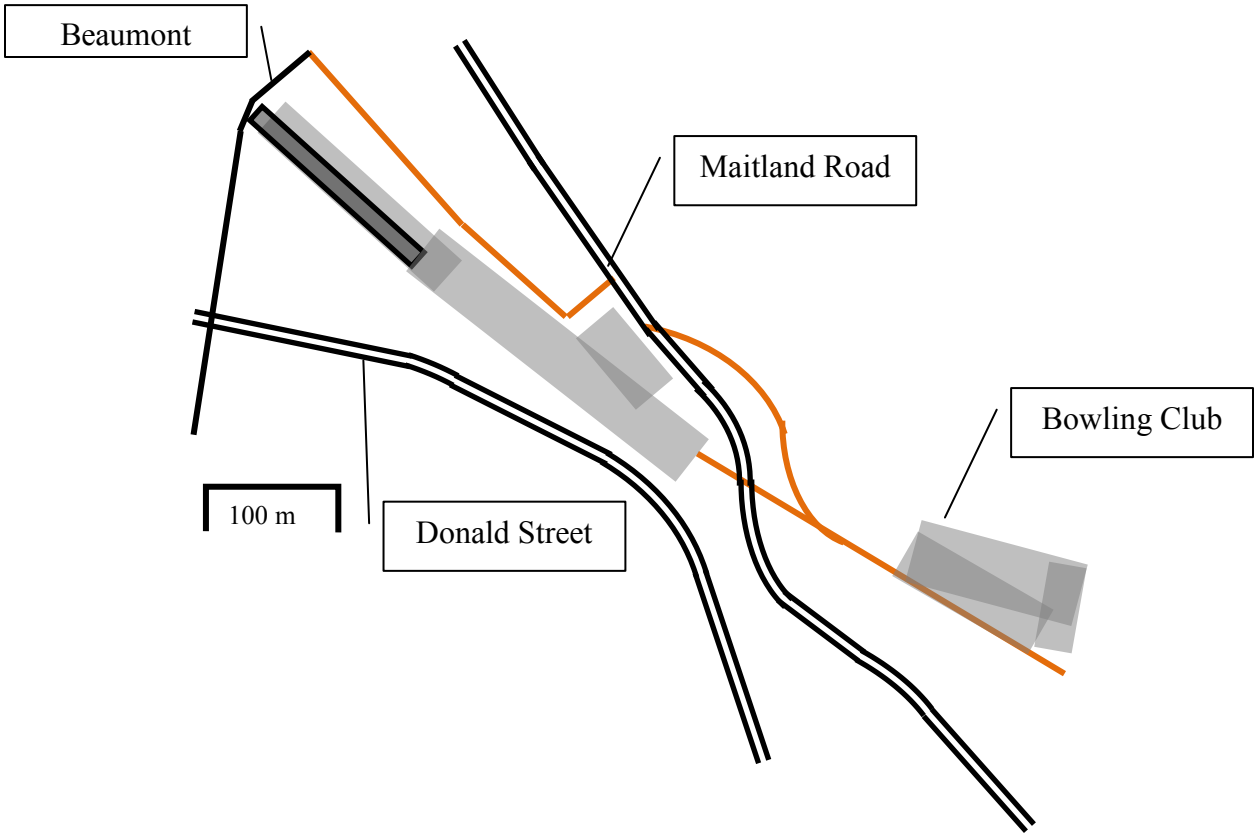
Given these requirements for traffic other than private motor vehicle traffic, public transport must increase its share to from 20% to 35% of peak hour traffic. The Bizios (2010) concludes, and the AECOM study indirectly confirms, that this cannot be achieved without a priority public transport corridor through Newcastle West, and in particular which bypasses traffic in the area of Hannell Street / Stewart Avenue.

Given the existing rail infrastructure in place, the most cost-effective means of providing this priority corridor is a light rail system.

Hamilton Station Airspace Development on the Light Rail Corridor

The most attractive location in the railway land neighboring the existing Hamilton Station is the empty parcel fronting Maitland Road as it rises for the overpass, to the east of the Surf Factory building on the corner of Maitland Road and Fern Road, 2.5ha of property (properties 14-18 in the Duponts (2004) study of Railcorp property in the corridor). A ground and first floor on this parcel footprint could give access to a second floor mezzanine with access to apartments above and to the Donald Street entrance to the new Hamilton Transport Interchange via a Donald Street entry point. From the third floor height, apartments would have an overlook on the cricket grounds of park. With foundations within the current passenger rail corridor and the former freight rail corridor, there should be no height restrictions related to mine-subsidence issues.

Next to the current Maitland Road passenger rail corridor underpass, there is an unused freight rail underpass. This is proposed to give access to the Transport Interchange for buses eastbound on Maitland Road. As only one lane is required, it can also give pedestrian access to new parking on the site of the bowling club on railway land between Wickham Park and the rail corridor: lot 21 in the Duponts (2004) study of Railcorp property, which at 2ha has space for approximately 600 parking spaces. The space not required for resident parking may be allocated to gateway parking in support of the nearby Railway Street light rail platform.

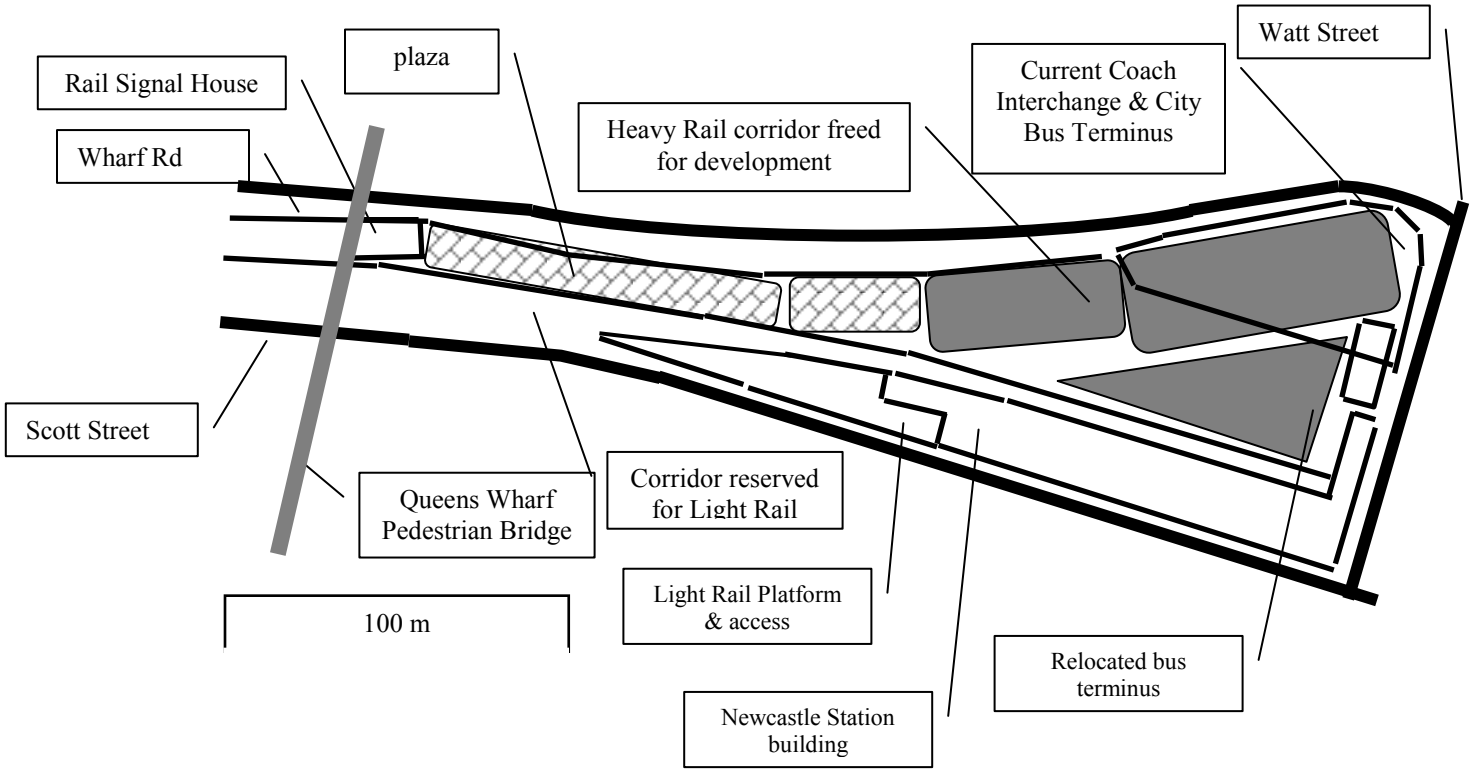


Newcastle Station Airspace Development on the Light Rail Corridor

The conversion of the heavy rail corridor to a light rail corridor opens up substantial opportunities for both ground level and airspace development of the rail corridor land at the Newcastle Station complex. It frees up the island hosting platform 2 & 3 as well as the side platform 4, and associated platform track. It frees up the stabling track and the current heavy rail signal house, since both are redundant to the needs of the light rail system.

The current bus interchange is under-utilized, since the city buses do not allow passengers to board and so it only serves as an interchange for intercity coaches. The coach interchange can be relocated into part of the area presently used by heavy rail platforms and platform lines and railway staff parking, with city bus parking between services provided for in the same area, as indicated by the grey triangle in the plan below.

This frees up space in the rail corridor at Wharf Road and Watt Street. North of the heritage listed Newcastle Station building are development opportunities for conventional development, either apartments, professional, mixed use retail on ground and first floor and apartments above, or government buildings, which may including airspace development opportunities above the site of the relocated bus terminus. To the west of the Newcastle Station building there is opportunity for the open plazas along Wharf Road desired by many members of the local community, along with greenway landscaping of the rail corridor itself and more discreet fixed tension catenary replacing the visually obtrusive variable tension stanchions.

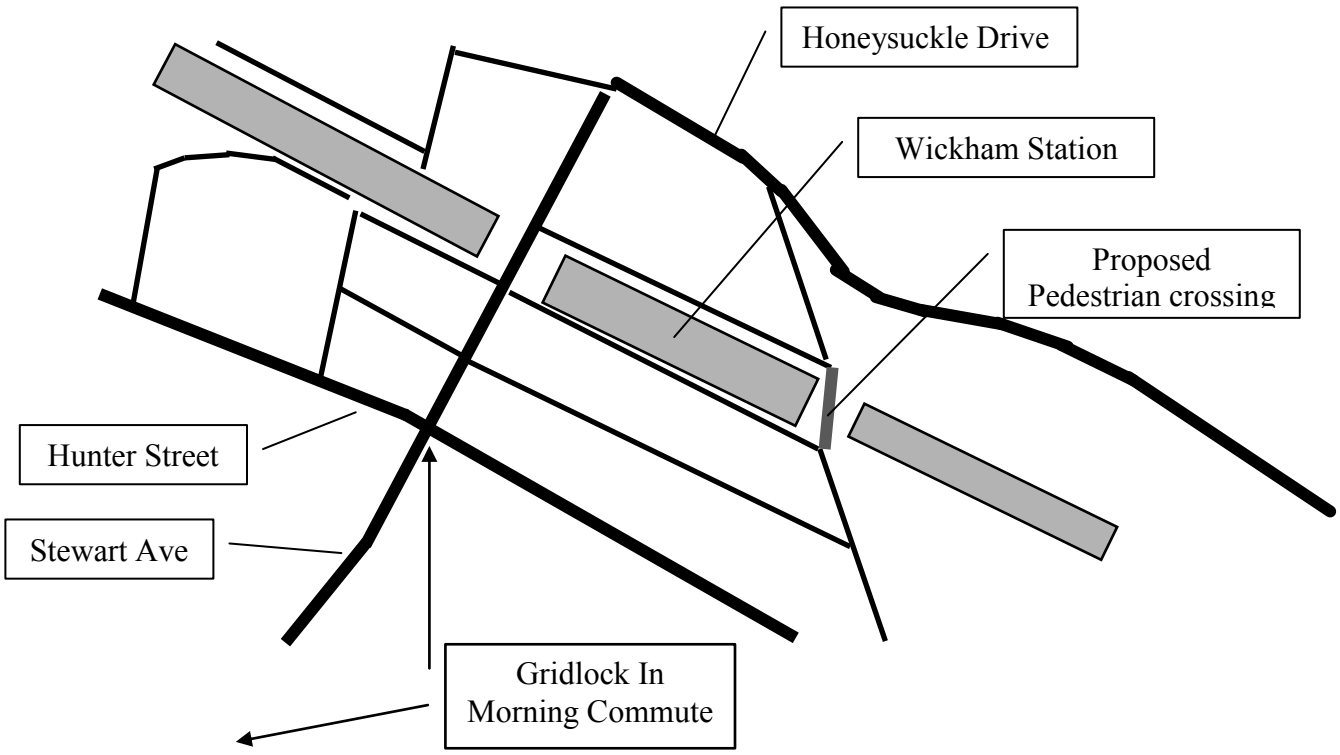


Wickham Station Airspace Development on the Light Rail Corridor

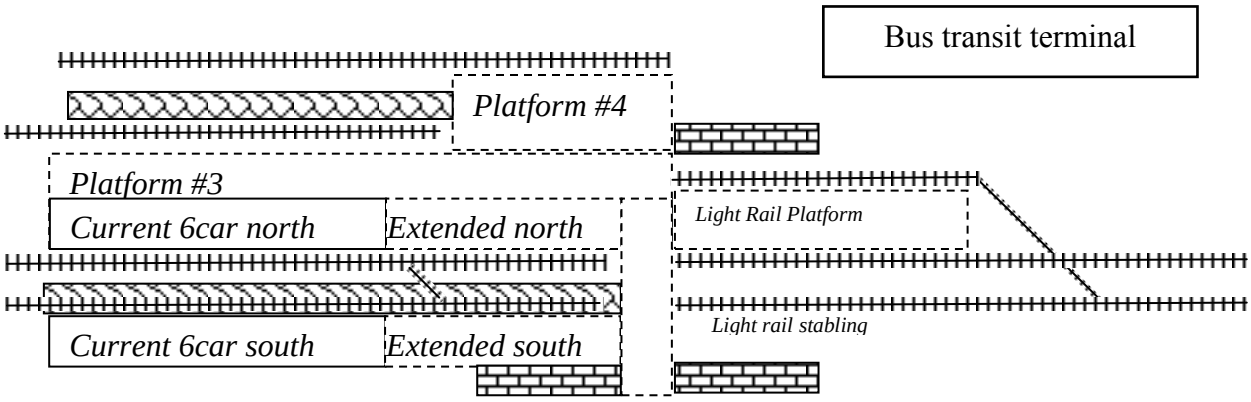
Under this light rail proposal, Wickham Station becomes redundant. Airspace development opportunities are not as substantial here as at Newcastle Station and east of Hamilton, but there are prospects to justify holding the Wickham Station precinct in reserve for future airspace development of the corridor.

The Duponts (2004) study for TIDC of Railcorp property in the Newcastle Corridor revealed limited Railcorp properties along this section of the corridor. Ground level redevelopment opportunities along the corridor are therefore limited. On the other hand, this site is east of the most serious morning commute gridlock intersections, and the new Steel Street level crossing will offer ready access to Hunter Street east of these gridlocked points. It also offers a prospect on the Throsby Creek inlet and the Yacht Club Marina, and is close to existing professional development and HDC sites available further development, including establishment of the University of Newcastle CBD Campus

The prospective future airspace development opportunity is therefore residential apartments with elevator entrance at ground floor but most of the ground floor level devoted to parking, and the building footprint beginning at the second floor above ground level. The foundation for this site would be entirely within the rail corridor, so that mine-subsidence height restrictions would not be an issue. The available space on the fringes of the corridor to the east and west of the Wickham Station site are probably best suited to additional covered parking, with the eastern parking connected to the Wickham Station development site at ground level, and the western parking connected by a pedestrian bridge across Stewart Avenue.



4. A Station Layout for the Hamilton Terminal Option



Terminal Layout in RailCorp Property adjoining Hamilton Station

The Hamilton Transport Interchange complex is sited east of Beaumont Street through to the eastern end of Fern Street. Railcorp property between the rail corridor and Fern Street is available for City Bus and Intercity Coach interchange, Railcorp staff parking, and staff facilities, with more detailed scoping study required to determine use or replacement of existing buildings and then placement of these facilities.

Terminal Layout and Passenger Access

The current Hamilton Station has access on the western (Beaumont Street) side only, with access to Beaumont Street from both Platform 1 and 2, and a pedestrian bridge between the two platforms. Under the new layout, access from Donald Street is provided by ramps up from street level to an extension of the terminal end of Platforms 1 and 2. A pedestrian subway also extends from the Island formed by Platform 2 and 3 underneath the light rail platform tracks to access the Bus Transit Station to the east of the Hamilton Terminal Station, which is the remaining part of the Hamilton Transit Center.

Terminal Layout and Heavy Rail Passenger Operations

Hamilton Station originally provided two six car side platforms for inbound and outbound passenger trains, with an outbound waiting area, an overhead pedestrian bridge accessed by stairs, with entries to each platform from Beaumont Street. There is also access to the overhead pedestrian bridge from Beaumont Street.

This proposal extends the existing platforms so that they can be used as either a pair of eight car terminal platforms or as three four car terminal platforms. This is done with a rail switch between the current inbound and outbound track to the east of the current end of the platform, with space for a four car Hunter or OSCAR set to the east of the switch.

The existing footprint of Hamilton Station adjoins the space once allocated to a through freight line, connecting to the former Foreshore docks. The proposal resumes the third track crossing across Beaumont Street, which was once used for freight, to access an

eight car and a four car platform north of the current platform. The platform track for Platform Three is also provided with an inspection walkway.

On weekday mornings, a K-set six-car train from Gosford is broken down into three two-car trains, and then reformed into a six-car train in the evening. This operation is accommodated by the layout at Platform Two, which allows the three two-car sets to be divided, one stabled at the eastern end of Platform One, another stabled at the eastern end of Platform Two, and the third place at the western end of Platform Two for its outbound trip to Lake Macquarie.

Regular maintenance work on the Hunters is performed at the Hunter Service Center at Broadmeadow. Regular maintenance work on the electric trains are performed at a Sydney area service center. However, the Newcastle Station stabling lines are also occasionally used by some routes for light inspection of trains at set intervals. The inspection line next to Platforms Three is provided so that this may be performed with the train stabled at the platform, avoiding the crossing of Beaumont Street for these operations.

Note that the K-sets are nearing the end of their service life. This layout also allows for eight car OSCAR sets to be used for Lake Macquarie regional services, able to be split up into two four-car sets at Platform Two.

The rail corridor site for the proposed West Wickham Terminus would require substantial property acquisition to gain sufficient space for stabling at the platform, and so the West Wickham proposal is to perform stabling and associated operations in the area between the West Hamilton and Woodville junctions, west of Beaumont Street. The increased rail traffic required over Beaumont Street, both for trains in service and for moving trains to and from stabling, drove the requirement to close the Beaumont Street level crossing.

This layout avoids those stabling operation movements across Beaumont Street, with no more movements required across Beaumont Street than at present, so in this proposal the Beaumont Street level crossing is allowed to remain in use.

Terminal Layout and Light Rail Passenger Operations

The rail corridor east of the terminus is dedicated to the use of light rail vehicles. The two light rail platforms are on an island platform extending east of the heavy rail island platforms. To allow a cross platform transfer to a low-floor vehicle, the platform track climbs a 4% gradient to allow level entry at the height of the heavy rail platform.

Switching onto the platform tracks is automatic. An inbound LRV is switched to light rail platform 1 if it is unoccupied, to platform 2 if platform 1 is occupied, and to the LRV stabling line if both platforms on the island are occupied. There is a ground level light rail platform next to the stabling line for use as an auxiliary platform if needed, using the Donald Street station entrance ramp if necessary to access the heavy rail platform.

This layout supports an ongoing 10-minute or less light rail shuttle between Hamilton and Newcastle station, as well as allowing a light rail to be held at platform to meet an inbound heavy rail service.

Terminal Layout and Light Rail Major Maintenance Operations

A covered light rail vehicle shed is established with a light rail spur line on the south side of the main rail corridor, terminating at the rail overpass.

It is desirable to allow for deliveries of Light Rail Vehicles, modules, and components by freight rail, as well as to allow Light Rail Vehicles to be hauled by locomotive over the main rail network. Therefore the crosswalk over the current outbound through track is not a fixed structure, but can be removed to allow freight rail access to the light rail stabling line and light rail vehicle shed.

The occasional freight rail operation connecting to the LRV corridor would be scheduled for late at night, when only a single light rail vehicle is in operation to connect with the occasional night train. In this period four heavy rail platforms are not required, and the light rail vehicle may use the northern track as a bi-directional track between the Maitland Street overpass and Hamilton Station.

Traffic Congestion Impact

The recent study of the growing parking and traffic congestion in the Newcastle CBD found that locating a terminal rail station in West Wickham would increase the severity of gridlock on Stewart Avenue at the Hunter and King Street Intersections, accounting for three of the four main lines of access for motorists into the CBD. This was independent of the impact of the closure of the Railway Street and Beaumont Street level crossings required by the West Wickham terminal, which were outside of the traffic planning area of the study. It was also independent of impact on motorists of priority bus signaling required if intercity coaches are to access the West Wickham terminal.

Therefore the gain in traffic flow from opening up access from Industrial Drive to Hunter Street via Honeysuckle Drive and Street Steel would be partly offset by the congestion from station traffic, combined with the impact of channeling current Railway Street traffic onto Stewart Avenue.

This station layout and operating plan for the Hamilton / Newcastle light rail service allows motorists to gain the benefit of a Steel Street level crossing, while allows Beaumont Street and Railway Street level crossings to remain open. The unused Maitland Road freight rail underpass may be used by intercity coaches accessing a bus interchange at the Hamilton Station Transit Center, eliminating the need to cross any main car commuter road artery to access the Hamilton Station terminal.

5. An Indicative Costing of the Proposal

Our indicative costing of this proposal is:

- $162m for Station and Stabling facility construction costs
- $8m interchange and car park
- $8m for Light Rail corridor and platform construction/conversion
- $22m for Light Rail vehicles
- $10m in additional rail level crossings
- For a total $210m

Station, Stabling, and Interchange Costs – Costing of Wickham Terminal proposal

AECOM has performed a cost estimate for the West Wickham Terminus proposal as part of its *Investigation into the Feasibility and Cost Estimate of Terminating the Newcastle Line at Wickham* (2010). It estimates the cost as follows:

- $161.7m Station and Stabling facility construction costs
- $89.4m Land Acquisition
- $20m-$120m Environmental Remediation Allowance
- $8.2m interchange and car park
- For a total cost of $379.3m

The AECOM costing for the Wickham terminal proposal does not include provision of the additional buses required to replace the trains to Newcastle nor the additional facilities to garage the extra buses.

The portion of this proposal providing a heavy rail terminus at Hamilton Station is sufficiently similar to the Wickham Terminal Station to take the construction cost of the West Wickham Terminus as an indicative cost for the Hamilton Terminus. This includes the stabling and crew support facilities duplicating those presently available at Newcastle Station, and the interchange and car park.

There are three modifications of this cost estimate. First, since the AECOM project closes Beaumont Street while the Light Rail project leaves it open, $5m is added to allow for the works on the Beaumont Street level crossing. Second, the Hamilton Terminus is designed to fit into the footprint of Railcorp land, so no land acquisition is required, and the corridor remains in use for passenger rail traffic, so no environmental remediation except for those areas directly released for ground level development.

Light Rail Corridor Construction/Conversion Costs

For light rail indicative costs, we turn to *Review of the last decade of public transport infrastructure projects in Australasia,* by Scott Martin, CMILT, in the 2011 Proceedings of the Australasian Transport Research Form (28-30 September 2011). Martin uses costs in 2010 equivalent dollars, so is directly comparable to the AECOM estimates. Martin finds an average light rail construction cost of $11.9m/km, based on five projects. The above average construction costs occur for light rail along road medians, while the below average construction costs occur for construction in an inner-urban renewal area (Docklands) and through re-use of an existing, segregated heavy rail alignment (Sydney Light Rail extension). With the Newcastle Light Rail project most comparable to the Sydney Light Rail extension, we adopt its cost of $7.5m/km as an indicative cost.

Total new light rail work on the existing corridor is less than 500m, but some of that is elevated at three feet above the corridor grade, so to maintain a conservative indicative costing, we take this as a notion 1km of new light rail corridor:

- 1km @ $7.5m/km yields $7.5m

Light Rail Vehicle Costs

When Adelaide extended their City-to-Bay tramline and required new trams to maintain punctuality, they acquired Alstom Citadis trams from Madrid, which had purchased more trams than they required due to their scaling back of tramline extension plans. These are 32m trams with a seated capacity of 50 and a total capacity of 180. This may be a particularly low price due to the circumstances of the seller, so we set an indicative cost at $4.5m. As noted above, the initial service requires five light rail vehicles, four in ongoing operation and one spare:

- 5 light rail vehicles @ $4.5m/LRV yields $22.5m

Light Rail Corridor Level Crossings Costs

We budget the new level crossings separately, using an indicative cost of $2m for combined traffic and pedestrian crossing and $1m for a pedestrian-only crossing. These are substantially high for simple lighted crossings, but takes into account possible gated crossings for pedestrians at some of the higher speed crossings, as presently in place at Stewart Avenue. New combined traffic crossings are proposed for Steel Street, Worth Place, and Darby Street to Argyle Street, while new pedestrian crossings are proposed for Hannell Street to Bellevue Street, Brown Street to Wharf Road, Wolfe Street to Wharf Road, and Market Street to Wharf Road:

- 3 traffic crossings @ $2m/crossing yields $6m
- 4 pedestrian crossings @ $1m/crossing yields $4m
- For a total of $10m in light rail corridor crossings

6. Operating Revenue for the Newcastle East LRT Service

The most concise operating revenue plan for the Light Rail network is to use whatever operating revenues are planned to operating the connecting bus network. Given an average bus capacity closer to 50 than to 180 passengers, and the presumption of either diesel or natural gas powered buses versus electric light rail vehicles, the operating cost of the connecting bus system will be greater than the operating cost of the light rail system, so whatever operating revenue suffices for the connecting buses shall suffice for the light rail service.

However, the purpose of this plan is to support both high value and extensive complementary property development in the Newcastle City Centre. Given that the AECOM (2010) TMAP study does not offer the increased in public transport patronage required to do so, it is essential that operational planning for the Light Rail service incorporate features that allow for improved performance.

If the goal is to maximize the utilization of the service as opposed to driving into the Newcastle City Centre, the vehicle fare system must be focused on that end, rather than by a need to fund an operating budget. The features of this fare system should be:

- Free transit to those who have traveled to the CBD by public transport, or who make use of gateway parking facilities on the fringe of the City Centre rather than driving into the City Centre; and
- A single low all-day fare for other users, to encourage motorists who have driven into the city to leave their car in long term parking rather than driving around the city from one destination to another.

Therefore the Light Rail Vehicle should operate on a proof of payment basis, with random ticket inspectors. A Cityrail ticket to Hamilton station, an inbound Newcastle Bus Service ticket, an inbound Ferry ticket, an inbound intercity coach ticket, and a parking ticket at a gateway parking lot are all accepted as proof of payment, while a ticket machine in the Light Rail vehicles dispenses all day passes of $1 full fare, $0.50 concession.

Operating with such token fares implies that a dedicated funding source is required to fund the operating budget. The proposal here is to dedicate lease revenues from long term leases granted to surface and airspace development of Cityrail and other public property at Newcastle Station, Hamilton Station, and perhaps eventually the former Wickham Station to a Lower Hunter Transport Authority (LHTA), with offices at the Hamilton Transport Interchange. In managing these funds, the first responsibility of the LHTA shall be to fund the operations of the Newcastle LRT, and the mid-day free Newcastle Bus Zone.

It is the establishment of the all-electric Newcastle LRT that allows the airspace development over what was once a diesel train corridor, and therefore the second responsibility is to pay the benefit forward by accumulating funds for and then capital

works in support of public transport as directed by the Minister of Transport in consultation with the Lower Hunter Councils. Based on the published views of the Lower Hunter Councils, the first priority for these public works should be the Glendale Transport Interchange.

It has been suggested in other proposals to establish a congestion parking fee system, and use the increment in revenue to fund public transport operations. However, congestion parking fees will be less controversial if they are used to provide additional parking and other personal transport options, and therefore it is proposed that incremental revenue from congestion parking fees be directed to the LHTA to fund the establishment of park and ride parking, paid gateway parking in available areas surrounding the City Centre, and pedestrian and cycling infrastructure improvements.

While the proposed Light Rail Vehicle capacity is sufficient to current demands plus an excess to allow for future patronage growth, if investment in support of public transport, cycling, walking, and gateway parking are sufficiently effective to press against this capacity, expansion of LRT vehicle capacity would be one responsibility that can be given to the LHTA. Models of light rail vehicles such as the Alstom Flexity purchased by Adelaide can have modules added at any point in their life cycle, so this capacity expansion can be by vehicle extension as well as the purchase and operation of additional light rail vehicles.

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Duponts (2004) "Land Assessment and Development Report", prepared for the Transport Infrastructure Development Corporation (TIDC) for inclusion in *Broadmeadow Transport Interchange Feasibility Study (Part 3)*
Archived at http://pandora .nla.gov.au, originally:
http://www.transport.nsw.gov.au/pubs_legal/broadmeadow-interchange-study-part3.pdf

About the Author

Dr. Bruce R. McFarling presently lives and teaches Economics in northeast Ohio in the United States of America.

In 1996, Dr Bruce R. McFarling received his PhD in Economics from the University of Tennessee, with major fields in Economic Development and Regional Economics, and minor fields in Economic History and History of Economic Thought. His dissertation was *The Place of Central Places in Rural Development*, considering the role of distinct patterns of settlement structure and transport infrastructure in economic development in Grenada & the Grenadines and St. Vincent, two neighboring island states of the Windward Islands of the Commonwealth Caribbean.

Dr. McFarling taught at the University of Newcastle for the first decade after completion of his PhD, lecturing in Microeconomics, Macroeconomics and Quantitative Methods at the introductory level; Advanced Microeconomic Theory, International Trade, Economic Development, Business Entrepreneurship and Environmental Economics at the upper division undergraduate level; Honours Microeconomic Theory, Economic Development, and Projects in Trade and Development at the Honours level; and Macroeconomics, Microeconomics, International Trade, International Business, and Money and Banking at the MBA level.

Research Publications include "Finding a Critical Pragmatism in Reorienting Economics" (2009), in *Tony Lawson and His Critics*, Edward Fullbrook (ed); "Clarence Ayres Memorial Lecture: An Institutionalist Reconstruction of Culture". *Journal of Economic Issues*, June 2004; "Healthy Economic Theory Healing Autistic Accounting Theory: Visiting a Neglected Area of Institutional Economics". *Journal of Economic Issues*, Mar 2004, with Roman Lanis; 2002. "A Post-Keynesian Appreciation of Boulding's Reconstruction of Economics". *Journal of Post-Keynesian Economics*; and "Schumpeter's Entrepreneurs and Commons Sovereign Authority." *Journal of Economic Issues*, Sep 2000. Writings also include submissions to the series of Working Parties and Consultative Groups examining issues touching on transportation and small business development in the Newcastle CBD.

While living in Newcastle, for some years up until 2009, Dr. McFarling commuted by bus, foot and bike from Shortland to the University of Newcastle Callaghan Campus; by combined bus and train from Shortland and New Lambton to the University of Newcastle Central Coast Campus; by bike and bus from New Lambton to the University of Newcastle CBD site; by bike and bus and occasional combined bike and train from North Lambton to the Newcastle CBD site; and in three trimesters weekly by rail from the Newcastle CBD to the Sydney City site.

oxygen levels and suspended solids in the water are the cause of the fish deaths?

Eels and carp will live in greatly deprived oxygen levels in stagnate ponds and are the last to die when the pond dries up.

Second, why did the EPA refuse to answer questions about mine flows when asked by the media on Tuesday?

The coal mines that adjoin the Hunter River have licences to discharge excess water into the river. Why is it that they can only do so during times of significant natural water flows, as recently experienced?

If what they are discharging into the river is so safe and all clear, as the EPA would have us believe, surely there should be no restraints on its delivery?

Peter Bonomini,
Millers Forest

Politician's claim ust incredible

HE Liberal state Member for ort Stephens, Craig Baumann, ated on radio on Tuesday, arch 12 that the widening of the elson Bay Road between Bob's rm and Anna Bay was a major iority because it was a single ne and, in the event of a serious cident, the road would be cked in and out of the bay as.

could not believe my ears. his is the same man who does support the local residents in r opposition to Port Stephens or Bruce MacKenzie's posal to have B-double trucks n his sand mines pouring onto single-lane road between the F roundabout and the on Tree roundabout 16 hours , seven days a week, ting a serious safety hazard estriction of traffic flow up to and out of Nelson Bay d may fill pocket of council" d 14/2.

Brian Crooks,
Williamtown

rary move at solution

GREE with Keith Parsons hants still loose in room 12/3).

get Newcastle library from its current Laman ocation up to the old tle Post Office site, rate modern technology l have space for the books brary.

happens now, we will

Compassionate care

I AM writing to express my gratitude to those at the Emergency Department and Intensive Care Unit at John Hunter Hospital after my Mum was recently admitted into their care after suffering multiple cardiac arrests.

Every person I encountered was wonderful and Dr Paul Healey and his ICU staff were nothing short of amazing.

Not for one moment did I ever feel like ours was just another case in a place where I imagine these folks have lost track of how many lives they touch each day.

They treated my mum, family and friends with such compassion and incredible humility.

Unfortunately mum did not recover, but thanks to Dr Healey she passed with grace and dignity and I will forever be in debt to him and his staff for that.

They should be acknowledged more often for the tremendous job they do day in and day out.

The care they provided was beyond reproach – they are the absolute face of humanity and my family and I will never forget their kindness to my mum and us.

Lisa Davies, Mayfield

have a modern approach to requirements of a library for the future, but still embracing the heritage of libraries of the past.

I applaud Lord Mayor Jeff McCloy for putting the citizens o Newcastle first before the development of his own properties.

What would you say if the lor mayor actually began work on the Lucky Country Hotel and ignored the real reason he is ou lord mayor?

John Freun
Adamstown Height

Light rail option streets ahead

I FIND it impossible to believe that the city of Adelaide can afford a beautiful light rail people mover – running from the city centre to Glenelg – and Newcastle has rejected a similar system, running as a continuation from, say, Hamilton to the City terminal, mainly on prohibitive cost grounds.

A light rail track width could match that of the heavy rail, thus allowing for carriage maintenance and storage at current workshops. The twin tracks would be flush with the ground, with grass beside and between the tracks and a neat single row of T-bar gal poles to support the power cables.

The light rail station platforms would allow very easy access to the carriages as they would only be about 300 millimetres above the ground.

The light rail would obey the existing traffic lights at Maitland Road, Hannell and Merewether Streets, thus doing away with the current traffic congestion at these gates.

However, by far and away the most valuable benefit of this simple transport modification would be the world-class green belt it would open up for the citizens of Newcastle, from Hunter and Scott Streets across to Wharf Street and the river esplanade.

John Flett,
Wangi

Test stand down takes the mickey

AUSTRALIA'S cricket vice-captain Shane Watson has been skills in handling what cricketers across the globe see as the joke of the year.

If a coach and skipper can't tap the vice-captain on the shoulder at dinner and say, 'Mate can you drop the questionnaire in after tea?', then we ought to start thinking of sacking them.

Shane Watson – an Allan Border-medallist and team vice-captain – who, in addition, has a wife in advanced stages of pregnancy, deserves a hell of a lot better than what Mickey Arthur has dealt out.

It's not as though these blokes went out and got drunk and didn't turn up for a training session. They failed to fill out a questionnaire.

You really could be forgiven for thinking someone had taken the mickey.

Now Watson has flown home and could be lost to Test match cricket.

Well done, Pup.

Rob Irvin,
Anna Bay

Make car owners pay real price

CAR culture is sending the whole country broke.

Australia does not encourage safe, non-discriminatory, happy, healthy, sustainable active transport network for cyclists and three-wheeled mobility electric/assist devices.

Instead, Australia encourages killing people with cancerous car exhaust fumes, car crashes and sedentary lifestyle leading to the obesity epidemic which will bankrupt Australia.

We see the encouragement through where the money is spent.

Curtin University has done a study that shows the infrastructure costs for a new suburb are $684,000 per dwelling Some of this money comes from local councils, such as Newcastle City Council.

Why are the McMansions in Fletcher subsidised by the less wealthy residents of Newcastle?

Putting this money to infilling the city will make Newcastle a safe cycling tourist attraction and bring many visitors to town.

Daniel Endicott,
Islington,

Letter of the week

This week the letter judged the best, most succinct and interesting will win a special *Herald* letter-writing pen. The winner will be announced on Saturday on this page.

ssage board

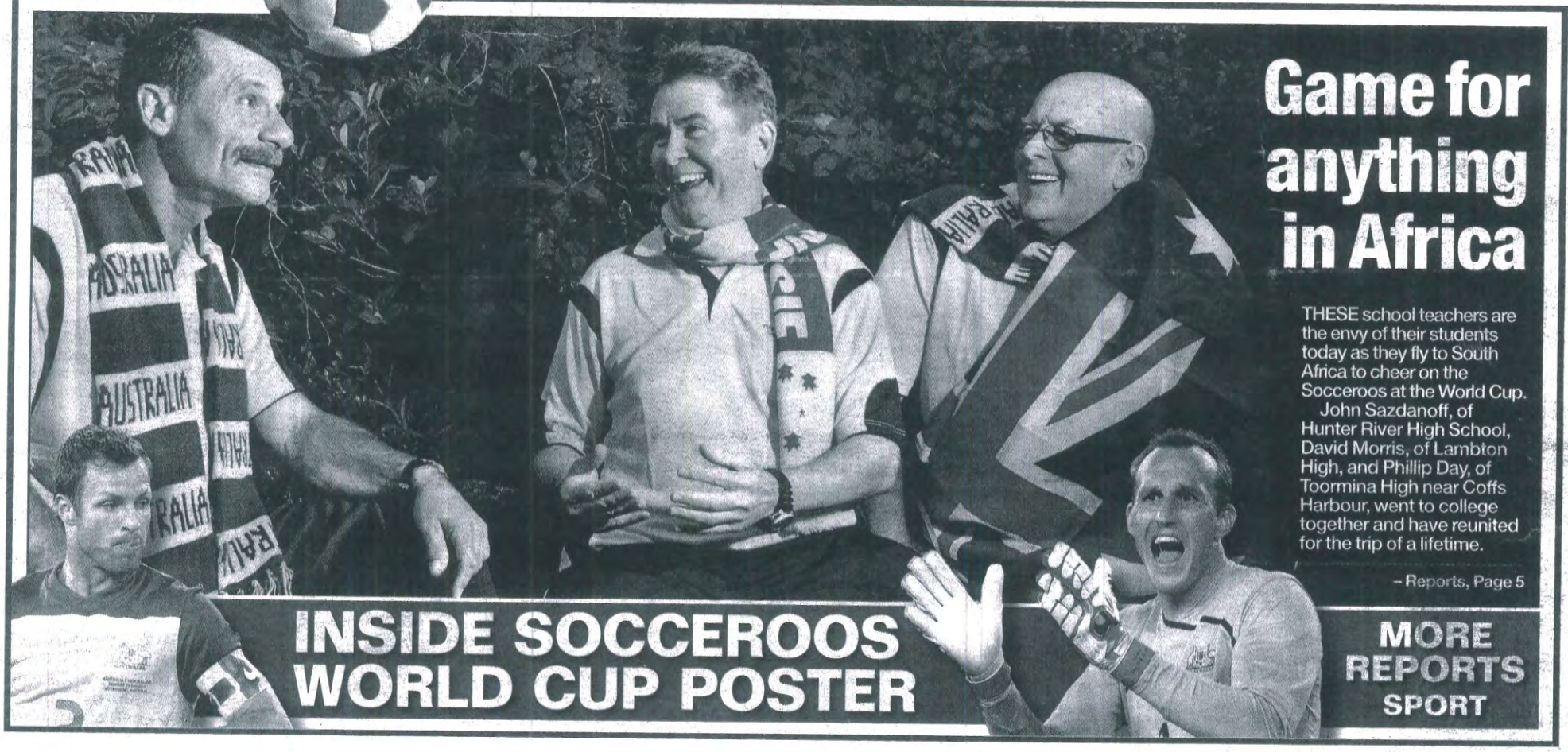
ur chance to say a brief nks" or contact people. e (02) 4979 5980 between m and 1pm Monday to Friday or email rs@theherald.com.au.

From Newcastle Family History Society:

Book Launch: *St John's Anglican Church Newcastle, NSW, Australia: Baptism, Marriage & Burial Registers 1857-1982) & 1871 Parish Census.* Sunday, March 24, 2pm at St John's Church, Parry Street, Cooks Hill. Afternoon tea to follow in the church hall. For details ring Brian Engle 0414 572 379

THE HERALD

Phone: 4979 5000 **THURSDAY,** JUNE 10, 2010 **$1.30** (GST inc)



Game for anything in Africa

THESE school teachers are the envy of their students today as they fly to South Africa to cheer on the Socceroos at the World Cup.

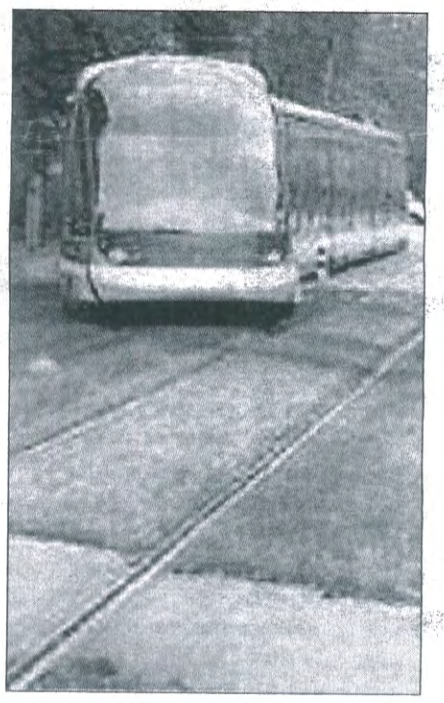
John Sazdanoff, of Hunter River High School, David Morris, of Lambton High, and Phillip Day, of Toormina High near Coffs Harbour, went to college together and have reunited for the trip of a lifetime.

– Reports, Page 5

INSIDE SOCCEROOS WORLD CUP POSTER

MORE REPORTS SPORT

Light still on for rail



ON TRACK: GPT says it is open to the idea of light rail for inner-Newcastle.

GPT chief's new line on CBD transport options

NEIL GOFFET
BUSINESS

GPT Group chief executive Michael Cameron has backed light rail as a suitable replacement for inner-city Newcastle's much-debated heavy rail line.

Speaking at the Hunter Business Chamber lunch in Newcastle yesterday, Mr Cameron said GPT would go ahead with its proposed $600 million retail project in the CBD if light rail was the city's preferred public transport option.

"For us it is all about reconfiguring the transport solution and replacing the current situation with something that's better," he said.

"And if that might mean light rail or a bus interchange, that would be a fantastic solution.

"The last thing we want to see is the transport process closed because obviously we want to see people coming into the CBD."

Minister for the Hunter and Newcastle MP Jodi McKay welcomed Mr Cameron's comments.

"The heavy rail line remains a barrier to good urban development," Ms McKay said.

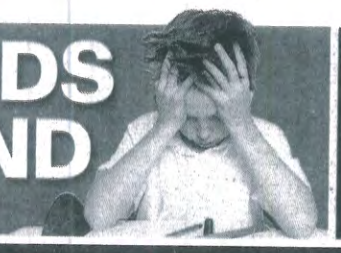
"I understand [Mr Cameron] would support any transport solution that would open up the city.

"I believe this demonstrates that GPT is willing to work with the government and the community to revitalise our CBD."

Professor Peter Newman, a board member of the Rudd government advisory body Infrastructure Australia, backed the light rail option during a visit to Newcastle last month.

Continued Page 4

OUR KINDY KIDS FALLING BEHIND
FULL SUBURB LIST: PAGE 3



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NEWCASTLE TRANSPORT

for

BUSINESS DEVELOPMENT

Introduction to the Lower Hunter Tram-Train Network

REVISED SUBMISSION TO

HUNTER DEVELOPMENT CORPORATION
23RD February 2009

EXECUTIVE SUMMARY

Newcastle Transport for Business Development proposes a tram train network for the Lower Hunter as an alternative to cutting the Newcastle railway as proposed by GPT.

Hybrid tram train technology will run on the existing heavy rail line complementing the existing heavy rail train service both from Sydney and the Hunter Line. Tram trains will run between Maitland, Newcastle and Morisset without the need for an interchange at Wickham. The existing Sydney and Hunter trains will continue through to Newcastle Station. The tram trains will allow for an increase in service frequency over time at a lower cost overall. Tram trains are now operating in Sydney, Melbourne and Adelaide and are rapidly becoming the preferred method of high capacity urban public transport round the world.

An essential component of the proposal is the installation of new level crossings at Worth Place and Steel Street, in particular, and possibly a pedestrian only crossing at Market Street, to improve connectivity between the Newcastle CBD and Honeysuckle and the foreshore.

Stage 1 of the tram train network will see the creation of the new level crossings and the introduction of tram trains between Hamilton and Newcastle with a loop along Union Street to the Junction and returning along Darby Street with another loop through the Hunter Street Mall.

The Tram Train network could be funded by the Federal Government infrastructure fund approximately to the same amount as that to cut the rail and build a new Wickham terminal, as suggested by GPT.

Subsequent stages of the proposal will see the tram trains extended to the University, Maitland and Glendale linking with express buses to Charlestown, John Hunter Hospital, Raymond Terrace, Cessnock and the airport via transfer stations at Shortland and Tickhole.

Integrated ticketing will be an essential component of the network integrating the new tram trains with the existing Newcastle Bus and Cityrail services.

Such a network allows for future growth in response to demand, as the population of the Lower Hunter grows as predicted, and provides a much improved public transport system for the whole Lower Hunter.

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APPENDICES

NEWCASTLE TRANSPORT FOR BUSINESS DEVELOPMENT

INTRODUCTION TO THE LOWER HUNTER TRAM-TRAIN NETWORK

Background

The Lake Macquarie Transport Taskforce outlined a proposal for a Tram / Train in 2007.

Newcastle Transport for Business Development (NTBD) has investigated and developed this proposal further.

The Proposal

The GPT proposal (referred to as the Wickham Terminal Option in this paper) proposes the expenditure of approximately $160 million to permanently reduce future transport options for all of the Lower Hunter. This paper advocates that a Newcastle City tram train service can be established for substantially less than that cost and, as stage 1 of a wider network, will significantly improve public transport in Newcastle, Lake Macquarie, Maitland and Port Stephens.

The proposed Lower Hunter tram trains will **complement** the existing heavy rail. The latest generation of tram trains can travel at speeds up to 100kph as required.

The proposal to close the railway line at Wickham Station is presented as an example of modern, mixed-use Transit-Oriented Development, precisely the kind of development that shelters an urban precinct from much of the pain imposed by periodic gas price shocks, whether driven by the Australian Dollar foreign exchange rate roller coaster or by the kind of crude oil price shock we saw in the winter of 2008.

However, it fails to consider the most important element of Transit-Oriented Development, which is more efficient use of valuable urban space through reduction in the average allocation of parking spaces required per pedestrian.

The rail line to be closed serves primarily to support access to Newcastle City from outlying parts of the Lower Hunter metro area, primarily from the City of Maitland and northern and western parts of the City of Lake Macquarie. There are 1,400 pedestrian entries to the CBD daily without requiring parking space support. A large share of these are rail commuters, arriving in the morning peak and leaving in the evening peak, and somewhere between 200 and 400 will drive rather than commute by rail if there is a break in service between their home station and current destination.

It is essential that we design and implement a public transport system that benefits the whole Lower Hunter community, (allowing for Peak Oil and future uncertainty) not just a select few.

The Lower-Hunter Tram-Train Network proposes a Newcastle City tram-train route, combining *additional* use of the existing rail corridor to access the Honeysuckle, Newcastle West, Civic, and Newcastle Mall precincts with a pair of Newcastle City tramlines that extends the access to include the Cooks Hill, Junction, and the Cathedral districts, extending to substantial new gateway parking at Hamilton Station.

The foundation of the proposal is the tram-train, a transport innovation of the past fifteen years, beginning in Germany but spreading into other European nations and to specific sites in the US.

It is reliance on the tram-train that allows this proposal to break the bottleneck of vehicle and pedestrian access across the passenger-only rail line.

Sustainable Cities

In 2005 the House of Representatives Standing Committee on Environment and Heritage handed down its report on sustainable cities. Amongst the recommendations on transport are the following:

- One particular mode of transport that appears to be overlooked is that of rail particularly light rail

- Strong rail cities are 45 percent wealthier than weak rail cities. Strong rail cities spend less on road transport and are more cost effective in their transit operations. Proper use of rail saves time and money.

- Since 1994 100 cities worldwide have now built or reintroduced light rail systems but in Australia government funding for urban rail transport is lacking.

- Reliable swift and affordable urban rail systems can have positive impacts on savings (both personal and city), health and transit speed.

Tram Train

The Lower-Hunter Tram-Train Network addresses these issues. It proposes a Newcastle City tram-train route, combining *additional* use of the existing rail corridor to access the Honeysuckle, Newcastle West, Civic, and Newcastle Mall precincts with a pair of Newcastle City tramlines that extends the access to include the Cooks Hill, Junction, and the Cathedral districts, extending to substantial new gateway parking at Hamilton Station.

The foundation of the proposal is the tram-train, a transport innovation of the past fifteen years, beginning in Germany but spreading into other European nations and to specific sites in the US.

It is reliance on the tram-train that allows this proposal to improve connectivity between the CBD and the foreshore and break the bottleneck on vehicle and pedestrian access across the passenger-only rail line.

The first stage of this proposal, the Newcastle City Tram-Train, is the direct alternative for the Wickham Terminal Option. It supports a local Tram / Train route between Newcastle Station and Hamilton Station, connecting the Beaumont Street district, the Newcastle West district, the western Honeysuckle District, the Civic

District, The Junction district, the Newcastle Mall district and the Queens Wharf district.

The indicative cost is $90m. Unlike the Wickham Terminal Option this includes capital acquisition of rolling stock but, in line with Wickham Terminal Option, does not include operating costs.

The second stage and third stages of this network provides direct trips to an increased number of Lower Hunter residents and to a greater variety of Newcastle City destinations. It provides single transfer trips to those destinations for a large majority of Lower Hunter residents. By contrast, the Wickham Terminal option requires a minimum of one transfer for a majority of Newcastle City destinations, and imposes multiple transfers on residents of outlying areas.

Advantages of retaining rail into Newcastle

These advantages come largely from the work of distinguished planners and economists NTBD have studied and consulted:

- A critical factor is that the Lower Hunter can expect 160,000 new residents over the next 25 years. Direct rail access into the CBD will be a significant on-going benefit.

- Cities best able to handle growth are those with well developed public transport.

- Approximately 100 cities in the US are considering new rail projects. 44 US cities are proposing to retrofit rail which was previously removed.(Professor Peter Newman)

- Trains are more reliable than buses, and are usually faster with higher capacities.

- Being fixed assets trains provide a higher level of certainty for passengers, commuters and developers.

- Property values always increase when rail is added and decrease when rail is removed.

- The wealthiest cities are those with rail to the CBD. (Professor Peter Newman)

- The best generator of retail business is foot traffic and the best generator of foot traffic is rail.

- If passengers are forced to change mode at Wickham then up to 60% may switch to cars which will exacerbate parking issues.

- The Marchetti principle dictates that people will generally limit their daily commute to one hour a day. If the trip takes longer they will change their arrangements to minimize the journey time. Introducing a change of mode at Wickham will increase journey times for Lower Hunter commuters. This appears to have been confirmed by a recent survey of

Maitland commuters which indicated that many will consider using their cars if the Wickham interchange results in longer journey times.

Advantages of the Tram Train for Newcastle

The tram train proposal will have the following advantages:

- Addresses the perceived 'barrier' issue between the CBD and the foreshore by opening up and landscaping the rail corridor.
- Allows increased connectivity with additional level crossings - both vehicle and pedestrian.
- Allows for increase in service frequency over time at a lower cost
- Eliminates the need for an expensive overpass at Stewart Avenue or interchange at Wickham.
- Allows the existing Stewart Avenue level crossing to operate with tram activated traffic lights which can be coordinated with the Hunter St traffic lights.
- Provides a new public transport network which can be gradually extended across the Lower Hunter as population growth demands.
- Can be built in stages as required.
- Provides the light rail system that Novocastrians have continually requested in public opinion polls.
- Retains all the benefits of direct heavy rail into the Newcastle CBD and beaches.

Integrated ticketing & ongoing management

To ensure the full benefits of the Tram / Train proposal are realized it is essential that a fully integrated ticketing system is implemented integrating the existing heavy rail and bus systems with the proposed tram / train and tram / bus system.

It has been suggested that the best form of on going management would be to create a Lower Hunter Transport Authority. This could be a desirable long term objective but probably not realistic in the short to medium term.

The proposed Tram Train network could be managed by Newcastle Buses or a similar arrangement provided suitable access arrangements to the heavy rail corridor are negotiated.

Parking

A commuter requires a parking space all day, plus additional parking spaces in the local area during their lunch hour, so taking a parking place requirement of 1.25 per motor commuter, it is reasonable to estimate that the Wickham Terminal option must first find 250 to 500 additional parking spaces in the Civic and Newcastle Mall precincts.

In addition, a successful mixed use redevelopment in the Newcastle Mall Precinct assumes a substantial increase in pedestrian access to the precinct during business hours. The proposed local bus loop with interchange with regional bus routes at the Wickham Station Terminal Interchange provides no substantial inducement to a mode shift away from car traffic, since the increased convenience within the CBD district of a dedicated bus loop is offset by reduced convenience for access to the CBD district by bus and rail, and the proposed loop omits the Cathedral district, Cooks Hill, Darby Street, and The Junction.

Also omitted from the Wickham Terminal Station proposal is the additional pedestrian access required for commercial success of the professional and retail components of the development, and the parking access required to support this access.

Level Crossings

A key component of the Tram / Train proposal is the provision of additional level crossings at Worth Place and Steel Street and a pedestrian only crossing at Wolfe, Brown or Markets streets in the CBD.

High quality level crossings are far less expensive than full grade separation. ***For the current frequency of rail services***, well designed level crossings are closed for shorter intervals than traffic lights, so that proper design of responsive traffic signal cycles can remove level crossings as a factor in delaying motor vehicle traffic.

So ***at current service levels***, any reasonable cost-benefit analysis will conclude that additional level crossings are by far the most efficient solution to the problem of access across the rail corridor.

Certainly we wish to eliminate as many level crossings as possible across coal lines in any urban setting. However, this is not an issue in the passenger-only Newcastle CBD rail corridor.

The problem is, the ***most efficient use*** of the rail corridor in a parking-congested urban setting ***requires an increase in the number of services*** along the rail corridor, combined with an increase in the number of stops along the rail corridor.

Enter the tram-train. In this proposal, existing conventional passenger rail service frequencies are not changed. However, tram-train routes are added to the service mix through to Newcastle Station. These operate on new tramline loops to the Junction, and through the Hunter Street mall, and also operate on the existing rail corridor.

However, when operating through a level crossing, ***the gates remain up***. Interaction between motor vehicle and pedestrian traffic on a level crossing and the tram-trains are controlled by traffic signal, not by crossing gates. So no matter how many tram-

train services are ***added*** to the corridor, the number of gate closures remains unchanged.

Safety of level Crossings

One of the key aspects of the Tram Train proposal is the provision of additional level crossings at Steel St and Worth Place. Newcastle City Council has had a long term plan to provide these crossings and have constructed the necessary road works. Unfortunately Railcorp have steadfastly resisted any such crossings, presumably on the grounds of safety, leading to the belief by some that new level crossings are impossible, even prohibited.

In fact here is no general prohibition on new level crossings and it is notable that the Department of Planning interim guidelines – Development Near Rail Corridors, just released, allows for level crossings and sets out the planning considerations for level crossings.

Evaluating proposals for new level crossings should consider costs and benefits in the circumstances of the case.

New level crossings in Newcastle City are highly desirable in order to reduce the 'railway barrier' problem between the Central Business District and the waterfront redevelopment area.

New crossings would create minimal risk if properly managed. Risk management may take advantage of the fact that the line sees passenger trains only at relatively low speeds. Freight trains no longer operate on the Newcastle line and never will again.

The main risk is that a vehicle queuing illegally on the tracks is trapped when the boom falls. New crossings, by increasing total road capacity, will spread traffic and so reduce queues. **This will probably reduce the risk exposure of Newcastle City crossings in total.**

Refer to appendix 3 for a risk assessment of the proposed level crossings.

Summary of Indicative costs

NTBD has investigated the indicative costs of the tram/train proposal. We have identified a number of recent and costed tram/train projects and proposals, both overseas and in Australia, that indicate a range of costs depending on local circumstances.

Reference is made to a number of specific projects or proposals;

1) The Box Hill extension in Melbourne, opened in 2003, is 2.2km in length and cost $28m.

2) The Vermont South extension project opened in 2005 is a 3km extension with total cost of $42.5m, with $12m allocated to system operation, for a construction cost of $30.5m

3) The City of Port Adelaide Enfield light rail proposal identified proposed costs in 2006 ranging from $8m per km to $14m per km including rolling stock

4) Report to the City of Sydney - Oct 2008 by G Dawson – light rail – capital cost including double track, stations/stops - $10m/km and upwards

We have determined that the indicative costs of a single track tram / train is approximately $6 million per kilometre including rolling stock.

In 2006 the Port Adelaide Enfield Council (PAEC) prepared a report including costings of a proposed tram/train. It is understood the proposal has since been taken up by the South Australian Government and included into a city wide proposal.

The 69 page report includes a schedule of costs which range from $8million per km of double track (mainly new rolling stock on existing track) to $14m/km of double track which includes all the rolling stock, contingency etc

Indicative costings of the complete NTBD tram /train proposal based on the PAEC and other work is as follows:

- Hamilton to Newcastle - upgrade existing line with new rolling stock - 3.5kms @ $8m/km = approx $52million
- University single track loop – 3 kms @ $14m/km = $42 million
- The Junction single track loop – 4kms @ $6m/km = $24 million
- Maitland single track loop - 2.5 kms @ $6m/km = $15 million
- Hunter St Mall single track loop – 1.5 kms @ $6m/km = $9 million
- Hamilton & Glendale loops - $4 million
- Points, extra platforms etc - $12 million
- Express buses to connect Charlestown / Shortland / Raymond Terrace approx $5 million

Total - $163 million

(Note: this is the total indicative cost for a 3 stage project spread over, say, a 10 year period)

The Development Project - Staging

Redevelopment of the Newcastle Mall precinct requires an effective regional transport system. This proposal rests on the use of existing rail corridors for the establishment of tram service in strategic locations, while retaining existing regional rail services, through reliance on "Tram / Trains".

The Tram / Train is a tram that meets the standards for operating on a standard rail corridor, and supports both street level access and rail platform level access. Pioneered in Karlsruhe, Germany, the Tram / Train technology support "regional tramlines" to the University, Maitland and Toronto relying on existing rail track for over 90% of the route, while providing substantial improvements in local transport access from the Junction, Cooks Hill, and the Hill areas to the CBD and the Foreshore.

The class of Tram / Trains required is a dual-mode, electric and diesel hybrid-electric vehicle. Diesel-electric hybrid tram-trains have already been produced for projects in Europe where the rail corridor relied upon lacks overhead electric infrastructure. Given the high frequency and relatively short distance of the two routes supported in Stage 1, the proposal is to go for the operational simplicity of a single class of Tram / Train that operates on electric power when available, and diesel power otherwise.

The improvement in CBD public transport services is leveraged by establishing a substantial number of public Gateway Parking sites east of Hamilton Station and east of the Maitland Road overpass.

The reach of the Tram / Train system is extended with Tram / Buses. These are Express Stop services in quality buses, bringing Charlestown Square, the John Hunter, the Jesmond Center, Cessnock, Raymond Terrace, and the Newcastle Airport into the system.

Two traffic crossings and a pedestrian crossing support Tram / Train egress from and access to the CBD rail line, with two additional pedestrian crossings provided in support of the new Tram/Train platforms contained within the CBD rail corridor.

Stage 1, Phase 1 (Newcastle City Rail Shuttle): $21.2m ($21.2m infrastructure)

- Level crossings at Steel Street, Argyle / Darby Street and Worth Place
- Free Bus Zone gateway parking and City bus parking at Maitland Road site
- In-corridor tram / train platforms at:
    - Brown Street pedestrian crossing
    - Railway Street level crossing
    - Honeysuckle Road pedestrian crossing
    - Maitland Road Overpass
- Establish Newcastle CBD shuttle, Broadmeadow / Newcastle Beach Station.

Stage 1, Phase 2 (Newcastle City Tram-Train): $67.5m ($46.5m)

- Hunter Mall Tramline
- The Junction Tramline
- Hamilton Terminal Loop Tramline
- Acquire initial Tram/Trains
- Establish Newcastle City Tram/Train, replacing Newcastle CBD Shuttle

Stage 2 (Urban Tram-Trains / Tram-Buses): $75.6m ($43.6)

- Charlestown Tram/Bus terminal at Shortland Station
- In-corridor tram/train platforms at:
    - Clyde Street level crossing
    - Maud Street overpass
    - Bridge Street underpass
    - Charlestown Road/Tickhole tunnel
    - Main Road overpass
    - Glendale Center
    - Argenton
- Glendale Terminal Loop at Cockle Creek
- University Tramline
- Acquire additional Tram/Trains and initial Tram/Buses
- Establish Charlestown/University Tram/Bus
- Establish Glendale and University Tram/Train, replacing Newcastle CBD Shuttle

Stage 3: (Lower Hunter Regional Tram-Trains / Tram-Buses)

- Extension of Lake Macquarie service to Wyong
- Maitland City tramline
- Establish Cessnock, Raymond Terrace, Airport Tram/Bus routes
- Establish Morisset / City and Maitland / City Tram / Train

Stage 1, Phase 1: Newcastle CBD Transport Access Improvements

The Newcastle CBD rail line is dedicated to passenger service only. There are no freight services. A well-designed level crossing on a dedicated passenger corridor is closed for less time than a normal red cycle at a traffic signal. Modern textured concrete pavers in attractive colors and patterns allow traffic and pedestrian to cross on a surface that is superior to pavement.

Therefore, the CBD rail line depends upon level crossings for pedestrian crossings and platform access to the new in-corridor Tram / Train platforms, and level crossings and at-grade switches for Tram / Train access and egress to the CBD rail line.

Level crossings should be avoided wherever possible on rail lines with heavy freight trains, because of the length and slow acceleration of trains carrying heavy bulk freight, and so new level crossings are restricted to the CBD passenger trunk corridor east of Hamilton.

The pedestrian improvements are achieved at the outset of the project, in Stage 1, Phase 1:

- Pedestrian crossing at Honeysuckle Platform, Brown St. Platform, and Wolf Street
- A new level crossing from Wharf Road to Darby Street via Argyle Street
- A new level crossing from Honeysuckle Drive to Hunter Street via Worth Place
- New Tram/Train platforms at the Steel Street and Brown Street pedestrian crossing
- Gateway Relief parking at Hamilton Station
- Gateway Relief parking at the Maitland Road overpass

To support release of the Enterprise Prospect site for development prior to introduction of the tramlines, a rail-corridor shuttle service is provided by two-car electric trains between Broadmeadow and Newcastle Station. Three sets permit the operation of four services per hour, with schedules fine-tuned to fit with existing regional rail services. If necessary, the rolling stock may be acquired from the local electric rolling stock recently retired from Cityrail service.

Stage 1, Phase 2: Hunter Street Mall Tramline

The Hunter Street Mall tramline is a one way loop that leaves the rail corridor via the Wolf Street pedestrian crossing then to the Hunter Street Mall, past the GPT redevelopment, then to Watt Street, then around the front of the Enterprise Prospect development site, then on to a new dock platform at Newcastle Beach Station. It re-enters the rail corridor via the former Newcastle Station stabling line to the Wolfe Street pedestrian crossing. This tramline is served by all tram/train routes.

Stage 1, Phase 2: The Junction Tramline

The Junction tramline is a one way loop that leaves the rail corridor via the Worth Place level crossing, down Union Street to Kenrick Street, Glebe Road, and Darby Street, accessing the rail corridor via the Darby Street / Argyle Street level crossing. Westbound trams stop at the Civic Station platform before and after leaving the loop. This tramline is served by the Newcastle City tram / trains twice per cycle, as an open loop eastbound and a closed loop westbound.

Transport access:

- Newcastle CBD, University, Maitland, Garden City, Cardiff, Glendale, Toronto
- Express Maitland, Lake Macquarie, Central Coast and Sydney via Hamilton Station.
- Cessnock, Raymond Terrace and the Airport via Shortland Station.
- Hunter Line via Hamilton Station
- Lake Macquarie / Wyong line via Hamilton Station
- The John Hunter Hospital via Charlestown Road interchange and Shortland Station.
- Newcastle Bus services via the Newcastle Mall Bus Interchange and the Junction

Stage 1: Parking and Traffic Flow Improvements

Merewether Street is the sole level crossing between Stewart Avenue and the end of the rail line at Watt Street. With Honeysuckle Drive and Lee Wharf road deliberately designed to serve local rather than through traffic, this funnels traffic through the intersections of Stewart Avenue with Hunter and King streets, which operate at capacity during peak traffic periods.

Opening up the Worth Place level crossing connects the eastern end of Honeysuckle Drive to the boundary of the Civic and Newcastle West districts. Opening up the Argyle Street / Darby Street level crossing connects the western end of Lee Wharf Road to the boundary between the Civic and Newcastle Mall precincts, as well as establishing the Merewether Street District as the northern end of the extended Darby Street district.

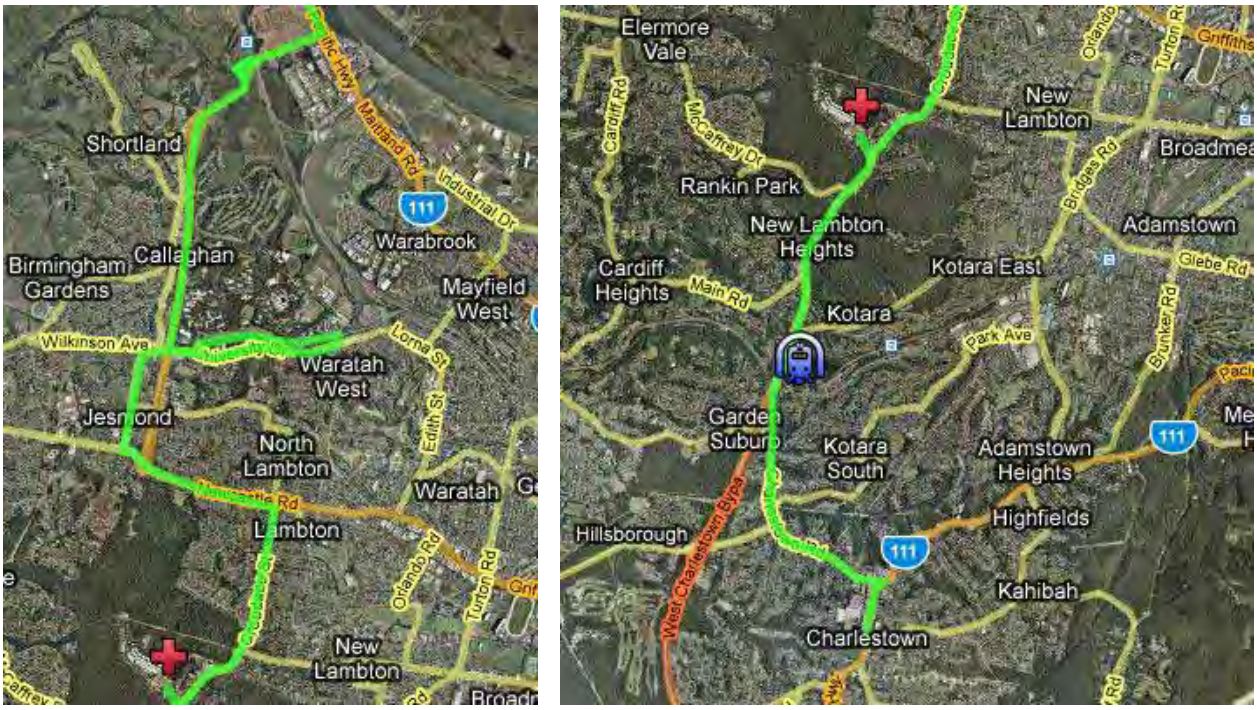
Substantial works have already been completed in the rail corridor to reduce gate closing times, which are now shorter on average than traffic signal delays. Further traffic improvements are provided for in this proposal by upgrading the traffic lights at the intersections of the crossing streets with Hunter Street so that they have four distinct cycles:

- Level crossing open;
- Level crossing closed; and
- Transition cycles when gates are preparing to open and close.

Putting these cycles into place requires a passive feed from the signals received by the crossing gates themselves to the traffic light control box. There is no change required to rail corridor signaling, saving a substantial expense, while a well designed multiple cycle system will improve the effective capacity of the traffic intersections.

Finally, substantial new parking is provided at several points, which is integrated with public transport options so that the car can be parked once for a visit with multiple stops in the CBD. Gateway parking is provided east of Hamilton Station adjacent to the new Hamilton Station Rail / Coach interchange. Gateway parking is provided on the other side of the Maitland Road overpass, adjacent to the new Newcastle Bus Service site, to access the start of the Free Bus Zone. Each of these connects with the new CBD tramlines, and each is provides with support for substantial pedestrian accessibility.

Stage 2: Charlestown / University Tram / Bus



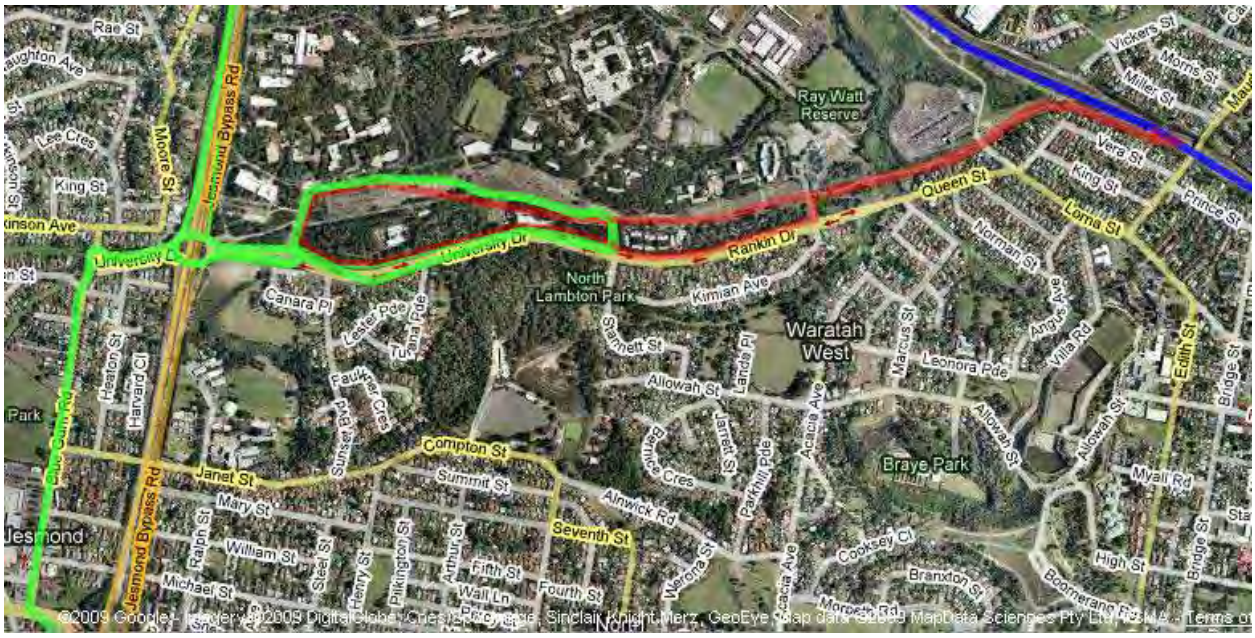
Tram/Buses are quality buses with tram/train style on-board ticket machines, low floor entry and one fewer row of seats than an equivalent city bus for improved luggage handling. The ticket machines including Lower Hunter Tram / Train and Rail services. They share livery with the Newcastle Tram / Trains and are operated as Express Stops Only services under tender, either by a private coach operator or the Newcastle Bus and Ferry service. Dedicated Tram/Bus stops have a raised curb height of 36cm for level boarding to and from both front and rear door.

The Charlestown/University Tram / Bus route runs from the Charlestown Square bus stop on the Pacific Highway through to Shortland Station, via Charlestown Road, Lookout Road, Croudace Street, Newcastle Road, the Jesmond center via Blue Gum Road, the University through the Design and Math bus stops, and the Western Newcastle Bypass.

Transport access:

- Newcastle CBD via the Charlestown Road / Tickhole tunnel. Transfer station, the University, and Shortland Station.
- Maitland via University and Shortland Station.
- Hunter Line via transfer at Shortland Station.
- Lake Macquarie / Wyong line via Charlestown Road interchange
- Raymond Terrace via transfer at Shortland Station.
- Newcastle Bus Services via the Charlestown Square, the John Hunter, and Jesmond Center

Stage 2: The University Tramline



The University Tramline is a two-way line that leaves the Main North west of the Maud Street overpass, which is the furthest west that the Main North passenger and interstate freight lines are on the University side of the rail corridor. The Maitland Tram / Train Eastbound Egress and the common Eastbound Access crosses over the westbound rail line at grade, and rail line priority holds the Tram / Train off the crossover until clear.

The Tramline continues behind International House to the Design Bus Stop, then to the Math Bus Stop, then along University Drive and Rankin Drive before returning to the rail corridor west of the Maud Street platform. When interchanging with the Express Rail stations, the University Tram / Train works as a closed loop from Waratah Station, while the Maitland Tram/Train works as an open loop between Waratah and University / Warabrook Stations.

The University Tramline is opened in Stage 2 for use by the University Tram-Train three times an hour, with one of the three services extended to the Maitland Tram / Train in Stage 3.

Transport access:

- Newcastle CBD, Hamilton, University, Maitland
- Hunter Line, Newcastle Express, Maitland Express via transfer at Waratah or University / Warabrook Station
- Jesmond, the John Hunter Hospital, Charlestown Square, Cessnock, Raymond Terrace and the Aiport via the Math and Design bus stops.
- Lake Macquarie Local via Hamilton Station
- Newcastle Bus Services via the Math and Design bus stops, Maud Street platform, the Junction, and Newcastle Mall Bus Interchange

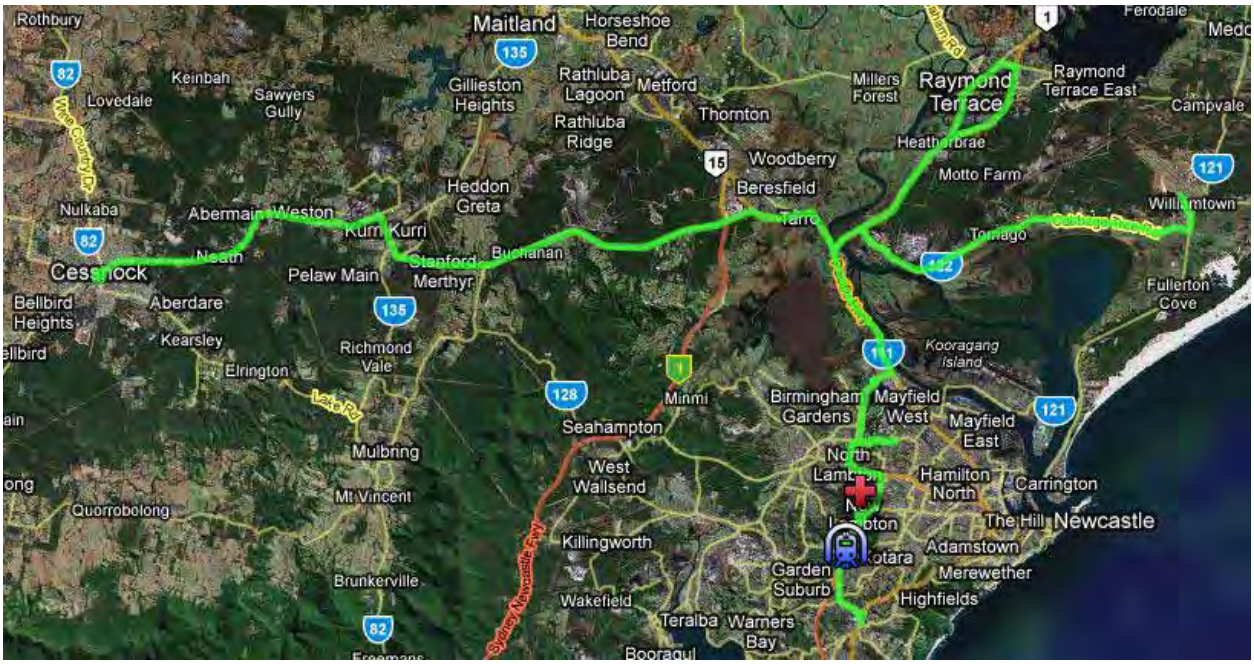
Stage 2: The Glendale Terminal Loop

To ensure compatibility with the proposed Lower Hunter Transport Interchange, the Glendale Terminal Loop must be located to the west of the Glendale Center to the north and Munibung Road to the south. It is therefore located directly west of Cockle Creek Station, the first local rail station after Glendale Centre.

Cockle Creek is also adjacent to the Lake Road overpass. This makes Cockle Creek a strategic choice for a possible future Tram / Train, Tram / Bus interchange, as Lake Road is a main road arterial for lakefront settlements in both the eastern and western parts of the City of Lake Macquarie.

The terminal loop itself is the minimum required to allow clearance underneath the Cockle Creek rail bridge, between Cockle Creek Station and the shore of the creek. Passing under the rail bridge allows for full grade separation between the tram-train terminal loop and the main rail corridor without requiring construction of an elevated structure.

Stage 3: Cessnock, Raymond Terrace, and Newcastle Airport Tram / Bus



The Cessnock, Raymond Terrace and Newcastle Airport Tram/Bus services are extensions of the Charlestown/University Tram/Bus route, completing the range of regional routes in Stage 3. They begin at Shortland Station and proceed on the Pacific Highway through Hexham.

- The Cessnock Tram / Bus originates at Shortland Station, proceeding on the Pacific Highway, New England Highway, John Renshaw Drive and Maitland Road to Cessnock, serving a terminal loop and returning.

- The Raymond Terrace Tram / Bus proceeds on the Pacific Highway to the northern intersection with Adelaide Street, returns via Adelaide Street to the Pacific Highway

- The Airport Tram / Bus originates at Shortland Station, proceeding on Route 122 to Newcastle Airport at Williamtown

Connecting to Shortland and Hexham stations as a pair allows for improved integration with Tram / Train and Local Rail services while substantially reducing Tram / Bus layovers waiting on the arrival of the train. Both Shortland and Hexham are upgraded for full ramp access, including a pedestrian footbridge over the Pacific Highway for Hexham Station.

Transport access:

- Charlestown Square, the John Hunter Hospital, Jesmond Centre, University
- Extension to:
    - Cessnock, Kurri Kurri
    - Raymond Terrace
    - Newcastle Aiport, connecting via coach to Nelson Bay

- Newcastle CBD and Maitland via Shortland/Hexham stations
- Lake Macquarie / Wyong line via Charlestown Road interchange
- Newcastle Bus Services via University, Jesmond Center, the John Hunter, and Charlestown Square

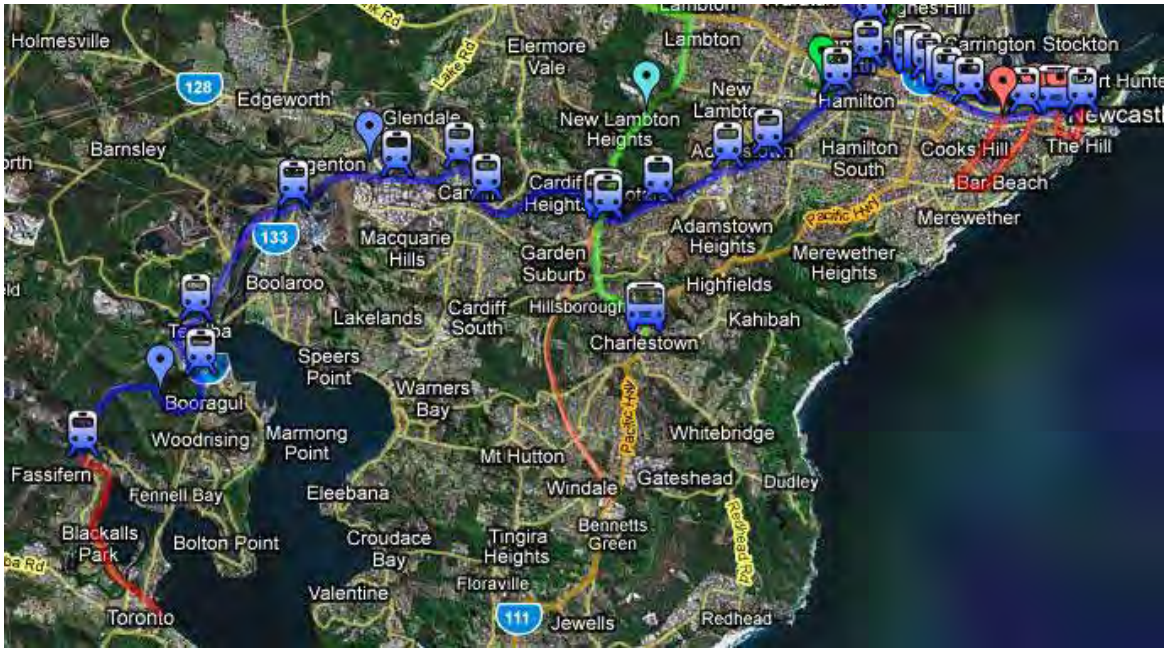
Stage 3: Extension of the Lake Macquarie Line

With completion of the North Warnervale Station in the Central Coast, as the terminus of Sydney Services from Wyong Shire, the origin/terminus of the Lake Macquarie line may be shifted from Morisset Station to Wyong Station.

With the shift of terminus, the Lake Macquarie local is free to operate in half hour intervals with the Newcastle Express at Wyong. The Local loses time against the Express, with the Fassifern Tram/Train scheduled to fill the gap, providing hourly service to Toronto and half-hourly service at Fassifern. The hourly Toronto Tram/Train completes one of the three hourly Glendale Tram / Trains routes.

Transport access:

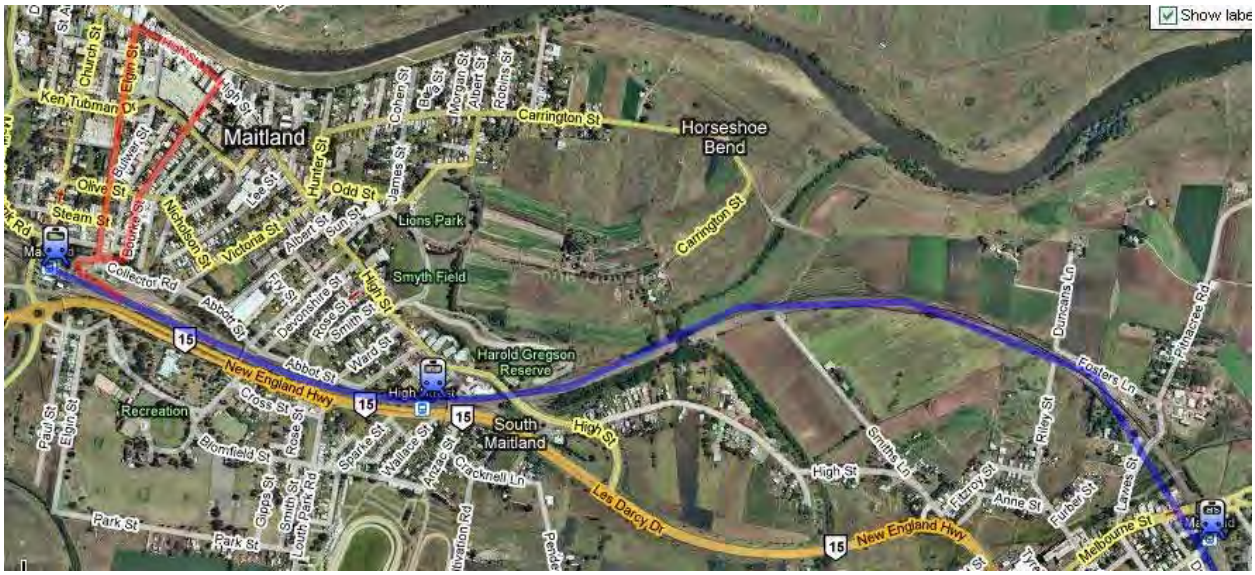
- Newcastle CBD, Hamilton, Garden City, Glendale Center, Morisset, Wyong
- Toronto via Fassifern Station
- Maitland and Hunter Line stations via Hamilton Station
- Express Sydney via Wyong, Morisset, Fassifern, Cardiff, Broadmeadow, Hamilton, Civic and Newcastle Beach Stations
- Charlestown Square, the John Hunter Hospital, Jesmond Centre, the University, and Raymond Terrace via the Charlestown Road interchange
- Local Newcastle Bus services via Charlestown Road interchange, Bridge Road interchange, Maitland Road interchange, and Newcastle Mall Bus Interchange.



Stage 3: The Toronto Bus Train

Toronto is currently served by an integrated bus service that coordinates with the heavy rail services at Fassifern. This service provides an improved level of service compared to the existing Newcastle bus service if only because the bus timetable is coordinated with the heavy rail timetable.

No change to this service is proposed except that integrated ticketing will be introduced as it will be throughout the network.



Stage 3: The Maitland Tramline

The Maitland Tramline is a one-way loop exiting the rail corridor east Maitland Station, switching to Bourke Street, High Street, Eight Street to return to the rail corridor. A dock platform is added as an extension to the north Maitland Station platform where the Tram / Train accesses the station.

The Maitland Tramline is opened in Stage 3, served hourly by the Maitland Tram / Train.

Opening the Maitland Tramline offers the possibility of also *replacing* the Maitland Local rail service, currently provided by Hunter diesel railcars. This might be in support of re-tasking of a small number of Hunter railcars to Countrylink for providing three daily rail services each way on the Far North Coast between Grafton and Byron Bay.

Transport access:

- Maitland, University, Hamilton, Newcastle CBD
- Hunter Line, Express to Newcastle CBD, Intercity to Sydney via Maitland Station
- Jesmond, the John Hunter Hospital, Charlestown Square via Shortland Station
- Raymond Terrace via Hexham and Shortland Stations
- Lake Macquarie / Wyong line via Hamilton Station
- Newcastle Airport and Nelson Bay via Hamilton Station
- Newcastle Bus Services via Lorna Street interchange, The Junction, and the Newcastle Mall Bus Interchange

APPENDIX A Indicative Costing

TRAMLINES

For indicative costing of the tram track and infrastructure cost per kilometer, an indicative cost of $6m per km is adopted for one-way street tramlines and $4.2m per km for one or two way tramlines in greenways.

For in-street construction, reference is made to three tramline extension projects in Melbourne. All three are two-way tramlines. The Box Hill extension, opened in 2003, is 2.2km and cost $28m. The Vermont South extension project opened in 2005 is a 3km extension with total cost of $42.5m, with $12m allocated to system operation, for a construction cost of $30.5m (though this also includes capital works for the complementary 732 bus route). The Docklands Drive extension, also opened in 2005, is 940m, and cost $7.5m. This gives an average in 2007 dollars (the most recent full year index available from the RBA) of $11.6m per kilometer for two-way tram routes, taken as $6m/route-km.

Constructing a tramline in a greenway substantially reduces capital cost. The North Central City Corridor Study for the Victorian Department of Infrastructure (Sinclair Knight Merz 2002) costs double track heavy rail at $1.9m, overhead at $0.8m/km and signalling at $0.8/km. In 2007 dollars, that is $4.12m/km for dual track heavy rail. The light rail track, overhead, and signalling each have lower capital cost than heavy rail, so for indicative costing, this proposal adopts $4.2m/km for greenway tramline, for both dual and single track.

CITY OF PORT ADELAIDE ENFIELD

In 2006 the City of Port Adelaide Enfield released a report entitled – Briefing Paper – Light Rail – a catalyst for Urban Development.

The report by Linqage International describes a proposal for a tram/train between Adelaide CBD and Port Adelaide utilizing existing the rail corridor as well as constructing new tramlines.

The report includes some comparative costs including;

- Glenelg tramway track upgrade & new tramcars - $7.77 million per km
- King William & North Terrace tram extension including additional tram cars - $14 million per km
- Greater Adelaide Tram system - $10.9 million per km

TRAM-TRAIN PLATFORMS

A design feature of the Newcastle City Tram-Train is replacement of the reverse driver module with a passenger trailer module with high-platform doors. This allows access to all existing local and express rail platforms without platform-side modifications.

This design feature means that Tram-Train specific platforms can be provided with on the order of 15mx3m platform space, which is small enough to fabricate the platform in steel or low-maintenance FRP composite off-site and bring on site for installation on a prepared foundation. This also reduces rail possessions, allowing

work to proceed on the foundations of multiple tram-train platforms in a single weekend possession, and installation to proceed in the low frequency overnight period.

For this indicative costing, the cost of an at-grade tram-train platform in the rail corridor is placed at $1m, and the cost of a tram-train platform requiring accessible ramp access from an overpass, underpass, or pedestrian footbridge is placed at $2m, with an additional $0.5m if more than 2 ramps are required. At the Charlestown Road Tram / Bus interchange, an additional $2m is added for the pedestrian subway under Charlestown Road.

Design costing of the Hamilton Station Coach Terminal requires detailed consultation with the coach operators that will be using the terminal. In particular, their preferences for access to and egress from the Coach Terminal will determine whether priority signal, round-about, or use of the open Maitland Road underpass used by the former freight rail line is to be used to gain access from Maitland Road to the Coach Terminal. An indicative envelope cost of $5m is placed on the Coach Terminal, and an additional $2m for gateway parking on rail corridor land west and east of the Maitland Road underpass, including at grade pedestrian walks.

TRAM-TRAIN POINTS

Tram-train points will be supported by signal-post priority signaling, with the Tram-Train signaling the need for a switch. There is a safety-interlock with railroad signaling permitting the switch, and when necessary a wait for a tram-train priority phase on traffic signals, and the tram-train receives a signal that it may proceed.

The per kilometre indicative costing of the tramlines is based on prior tramline experience and project costing guidance for electrified heavy rail, which will include the switching required. However, to discourage complexity in the rail corridor access/egress designs, a notional cost is applied of $1m per switch.

TRAM-TRAIN ROLLING STOCK

Alstrom's CITADIS Dualis bi-directional, dual mode electric / diesel hybrid electric tram train cars have been reported as delivered to recent tram-train projects for Euro 3.2m per car, or Au$6.4 million. Alstrom is a vendor that has sold in Australia, with trams currently in service in Melbourne. For this application, one low-floor bi-directional module would be replaced with a high floor trailer module with doors at rail platform level. While high floor rolling stock is generally less expensive than low-floor stock, and trailers generally less expensive than driving cars, there is also exchange rate risk, so the indicative cost per tram-train is taken as Au $7 million

In the Newcastle City circuit, it is assumed that two tram/trains are operating a continuous circuit with one in reserve, so Stage 1 is assumed to require three vehicles.

For Stage 2, the provisional estimate for complete cycles of the two cross urban services, based on the current local rail services with additional time for tramline service, is Newcastle Station to University and Return can be completed in forty minutes, and Newcastle Station to Cockle Creek station and return in an hour and twenty minutes, so that two sets are required for three University Tram / Train services per hour and three for a half-hourly Glendale service. This is a second tag requirement of an additional five vehicles.

The Tram / Bus is a low-floor bus with quality seating, geared for regional Express bus operation. An indicative cost of $800,000 is adopted. A provisional estimate, based on current Newcastle Bus Service timings on similar routes, is that the foundation Charlestown / University route with return can be completed within an hour, twenty minutes, so that four buses and a spare vehicle are required for a three per hour service frequency in Stage 2.

The provisional estimate is that the Fassifern / City tram-train can complete a cycle in under two hours, which is in addition to the two Glendale circuits each hour . The Maitland/City tram-train, which is an hourly extension of a University tram / train route, should complete a circuit in under an additional two hours. Extending the spare vehicles from one to two, five additional vehicles are required for these hourly Stage 3 services. Hourly extension of the Tram-Bus route to the Airport and Raymond Terrace can be completed in under an hour, and to Cessnock in under two hours, so four additional Tram/Bus vehicles are included for Stage 3.

SUMMARY OF INDICATIVE COSTS

STAGE 1, PHASE 1: $21.2 MILLION ($21.2M INFRASTRUCTURE)

Gateway Parking: $2 million
- Hamilton Station Gateway Parking,
- Maitland Road Gateway Parking,

Bus / Coach Terminal: $5 million
- Hamilton Station Coach Terminal,
- Maitland Road Bus Terminal,

Level Crossings: $3.3 million
- Crossing surface, four existing and five new, 9 at $0.1m, $0.9m
- Traffic Signal priority, three existing, two new, 5 at $0.1m, $0.5m
- Traffic Gates and rail signaling, two new, 2 at $0.5m, $1m
- Pedestrian Gates and rail signaling, three new, 3 at $0.3m, $0.9m

Tram / Train Platforms: $10m= million
- Grade Platforms, 2 at $1m, $2m
- Ramp Access Platforms, 4 at $2m, $8m

STAGE 1, PHASE 2: $67.5 MILLION ($46.5M INFRASTRUCTURE)

Rolling Stock: $21 million
- Tram / Train, 3 at $7m, $21m

Tramlines: $34.3 million
- Hunter Street Mall Tramline, 1.6km, $9.6m
- The Junction Tramline, 3.8km, $22.8m
- Hamilton Terminal Loop, 300m, $1.6m
- Hamilton Terminal Loop electrification, 300m at $0.8m/km, $0.3m

Corridor Access / Egress: $8 million
- Hunter Street mall tramline, 2 tram switches, $2m
- The Junction Tramline, 4 tram switches, $4m
- Hamilton Terminal Loop, 2 tram switches, $2m

Tram/Train Platforms: $4m
Dock Platforms, 1 at $1m, $1m
Grade Platforms, 3 at $1m, $3m

STAGE 2: $75.6M ($43.6 INFRASTRUCTURE)

Rolling Stock: $32m
Tram/Bus, 5 at $0.8m, $4m
Tram/Train, 4 at $7m, $28m

Tramlines: $23.1m
The Glendale Terminal Loop, 0.5km, $2.1m
The University Tramline, 5km, $21m

Corridor Access/Egress: $6m
Glendale Terminal Loop, 2 tram switches, $2m
University Tramline, 4 tram switches, $4m

Tram / Train Platforms: $12m
Ramp Access Platforms, 6 at $2m, $12m

Elevated Walkways and Disabled Access: $2.5m
Sandgate Tram / Bus transfer station
(*costed as 1 ramp access tram/train platform with 1 additional ramp*)

STAGE 3: $53.9M ($22.7M INFRASTRUCTURE)

Rolling Stock: $31.2m
Tram / Bus, 4 at $0.8m, $3.2m
Tram / Train, 4 at $7m, $28m

Tramlines: $51.4m
Maitland Tramline, 2.2km $12.2m

Corridor Access / Egress: $8m
The Junction Tramline, 4 tram switches, $4m
Maitland Tramline, 2 tram switches, existing rail switch, $2m

Tram / Bus Platforms: $2m
Dock Platforms, 2 at $1m, $2m

Elevated Walkways and Disabled Access: $2.5m
Hexham Tram / Bus transfer station,
(*costed as 1 ramp access tram/train platform with 1 additional ramp*)

APPENDIX B Indicative Service Scheduling

THE NEWCASTLE/WYONG LOCAL

This is organized around the schedule of the Newcastle / Sydney Express, where rescheduling would have repercussions throughout the Cityrail timetable. This is based on a balanced half hour frequency at Fassifern, the middle of the three Lake Macquarie Express stations.

Newcastle / Fassifern = +0:34, Fassifern / Wyong = +0:43
- Newcastle/Fassifern: 10:13 | 10:47 = +0:34
- Total trip time: 1:17
  - Midday scheduling of the Morisset local: 10:13 | 11:06 = +0:53
  - Midday scheduling Morisset/Wyong local: 11:11 | 11:32 = +0:22
  - Two new local stations (Charlestown, North Warnervale) = +0:02

Current Daytime Express at Fassifern
- Northbound: 10:29, 11:29, 12:29, 1:29, 2:29
- Southbound: 10:55, 11:55, 12:55, 1:55, 3:01

New local at Fassifern:
- Northbound: 10:29, ***10:59***, 11:29, ***11:59***, 12:29, ***12:59***, 13:29, ***13:59***, 14:29
- Southbound: 10:55, ***11:25***, 11:55, ***12:25***, 12:55, ***1:25***, 13:55, ***14:25***, 15:01

Three two-car K-sets are required to operate this schedule:

Wyong:	10:16	11:16	12:16
Fassifern:	10:59	11:59	12:59
Newcastle:	11:33	12:33	13:33
Newcastle:	11:51	12:51	13:51
Fassifern:	12:25	13:25	14:25
Wyong:	13:08	14:08	15:08

These are the number of K-sets currently scheduled to run to Newcastle Station from Greater Sydney during the morning peak and leading shoulder, returning to Sydney as part of the evening peak, with one two-car K-set and one four-car K-set. The operational change is therefore keeping the third K-set in service through the day rather than leaving it on the stabling line.

APPENDIX C Risk assessment of level crossings

RISK ASSESSMENT OF NEWCASTLE LEVEL CROSSINGS

G. Dawson, June 2006

SUMMARY

There is no general prohibition on new level crossings. Evaluating proposals should consider costs and benefits in the circumstances of the case.

New level crossings in Newcastle City are highly desirable in order to reduce the 'railway barrier' problem between the Central Business District and the waterfront redevelopment area.

New crossings would create minimal risk if properly managed. Risk management may take advantage of the fact that the line sees passenger trains only at relatively low speeds.

The main risk is that a vehicle queuing illegally on the tracks is trapped when the boom falls. New crossings, by increasing total road capacity, will spread traffic and so reduce queues. **This will probably reduce the risk exposure of Newcastle City crossings in total.**

BACKGROUND

It is proposed to install new level crossings in Newcastle City to reduce the problem of the 'railway barrier' between the CBD and the waterfront redevelopment area (HBC 2005:3; HTT 2006:1).

This may raise concerns about safety at crossings.

There is no prohibition on new level crossings

There is **no** Railcorp policy forbidding new level crossings under any circumstances (as is sometimes claimed).

The relevant policy is *Policy for Installing, Relocating, Removing and Changing the Configuration of Level Crossings* (Rail Infrastructure Corporation, August 2001).

The general policy is to minimise the number of crossings. However the policy recognises that in some cases community expectations or the cost of alternatives may conflict with this aim, and therefore it is not practical to prohibit new crossings entirely. Proposals are considered where 'no reasonable alternative is available', subject to a risk assessment (RIC 2001:9-11).

Assessing risk must consider all costs and benefits

In the Newcastle case the benefit of new crossings is the desired improved access to the foreshore. The cost is the possible risk to public safety created by new crossings.

There is **no** principle of risk management that says that a risk to personal safety, however small, must be avoided at all costs. If this were so, no transport system could operate at all. The community routinely accepts risks to safety in return for the benefits of mobility and access.

Some form of cost-benefit evaluation is essential in order to prioritise spending to reduce risk, or to evaluate a proposal that will create risk.[1]

Forgoing a benefit is equivalent to incurring a cost

Cost benefit evaluation of risk mitigation is usually thought of in context of proposals to incur a cost in order to reduce a risk (for example, grade-separating a level crossing). However it also applies where it is proposed to incur a risk in order to gain a benefit. In this case the cost of reducing risk is the value of the benefits forgone if the risk-creating action is refused.

Many transport improvements are in the category of incurring a risk in order to gain a benefit. For example, higher speeds will increase the severity of accidents, other things being equal.

In the Newcastle case the cost of avoiding the risk is the value of the desired access to the foreshore, which would be forgone if proposed new crossings are not built.

Risk at crossings <u>with barriers</u> is very low

Active crossings (with bells/lights or bells/lights/barriers) are over-represented in level crossing accidents.[2] This is because crossings chosen for active protection carry more traffic and so have a higher accident potential than passive crossings (which have signs only).

However, crossings with barriers must be distinguished from those with bells and lights only. The risk at crossings with barriers is very low compared with the risk at crossings with bells and lights only, after allowing for the different accident potential that results from different traffic levels.[3]

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1 A commonly stated principle is that risk should be made As Low As Reasonably Practicable (ALARP). This declares that some risks are so low that they require no special action; others are so high that they should be refused altogether; while risks between these extremes should be reduced to the lowest practicable level considering the benefits and costs of further mitigation. (SKM 2001:20; NTC 2004:16). An alternative approach is to value a death or injury explicitly and use that value in an economic cost-benefit calculation (NTC 2004:29).

2 Active crossings are about 30% of all public level crossings, but account for about 50% of fatal motor vehicle accidents at level crossings: Ford 2002:6; ATSB 2002:2.

3 Accident potential ('risk exposure') is approximated by multiplying traffic movements and train movements. For example, comparing a hypothetical suburban barrier crossing with 100 train movements and 10,000 vehicle movements per day, and an open rural crossing (bells/lights only) with 10 train movements and 1,000 vehicle movements per day: the first has an accident potential 100 times greater than the second.

Australia-wide, active crossings with/without barriers are in the ratio about 1:3 (Ford 2002), and fatal vehicle crashes at these crossings are in the ratio 1:4 (ATSB 2002:2). Thus the accident rates are similar in spite of the different accident potential. If the sample

Risk at crossings with barriers can be reduced further

In congested urban situations the major risk is that a vehicle queuing illegally on the tracks is trapped when the boom falls; or a pedestrian for some reason cannot clear the crossing in time.

Where the crossing operation is automatic (as is usual) this is a serious risk: in this case trains do not normally have a safe braking distance from the point where the danger becomes visible, so a trapped car or pedestrian will very likely be hit.[4]

This danger can be almost completely removed by using an operating system in which the crossing must be proved clear **after** the boom is shut, before the train is allowed to approach. This may be done either by a signaller controlling signals that protect the crossing, or by the train driver passing a suitably speed limited sighting point with sufficient braking distance.[5]

The second method allows a much shorter closure at the cost of slight delay to trains. It would be very suitable on the Newcastle line, which sees passenger trains only at relatively low speeds. It also reduces the cost of new crossings, as they do not need to be connected to rail signals.[6]

The minor risk is that a person tries to bypass the barrier to cross just in front of the train. This behaviour by motorists can be prevented by using median strips to stop cars from zigzagging around a closed half boom. For pedestrians the risk can be minimised by using powered gates with appropriate paths and fences to direct pedestrian traffic.

An additional risk with lower probability but possibly catastrophic consequences is that a level crossing crash derails the train.[7] This risk will also be greatly reduced by the interventions suggested above. The risk can be made negligible in any case by setting a low train speed.

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crossings above are typical it would mean that barriers, compared with bells/lights only, reduce risk by a factor of 100. A more accurate estimate would require information on traffic levels at individual crossings, which appears to be not available (ATSB 2002:4).

Wigglesworth (1991) found that upgrading 91 crossings from flashing lights to boom gates in Victoria from 1971 to 1989 was 'highly effective' in reducing accidents.

[4] Automatic crossings are designed to minimise closed time. The warning time is based on the time needed for traffic to clear the line, not on the time needed to stop a train (which is much longer). If traffic does not clear the line, there is no expectation that the train driver would be able to avoid a collision.

[5] '*Almost* completely removed': a remaining risk is that an inattentive train driver overruns a red signal in the first case, or fails to observe the crossing in the second. The probability that this behaviour will coincide with a blocked crossing must be very low. Where there is signal control the risk may be completely eliminated by some form of automatic train protection or train stop.

[6] In the UK this method is known as 'automatic barrier crossings locally monitored' and is listed as suitable for line speeds up to 90kph: Health and Safety Executive, *Railway Safety Principles and Guidance*, part 2, section E, 1996. See http://www.rail-reg.gov.uk/upload/pdf/rspg-2e-levxngs.pdf

[7] For example, accidents at Baan Baa NSW, 4 May 2004, and Trawalla Vic, 28 April 2006.

Application of these principles to Newcastle City

The Newcastle community is entitled to seek the benefits of improved access to the foreshore. It is entitled to conclude that the benefits of new crossings outweigh the risks.

The responsibility of Railcorp is to cooperate in minimising the risk, and to assure the safety of rail passengers, staff and property.[8]

Whether there is 'no reasonable alternative' to a new crossing (the core criterion of the Railcorp policy) must be considered in the circumstances of the case.

The fact that another crossing or overbridge exists within 500 metres may well justify refusing a new crossing in a suburban or rural situation. It does **not** justify refusing a new crossing in Newcastle City. The Newcastle City situation is unique in Australia. It is universally agreed that present access across the line is inadequate. The density of Central Business District activities requires a completely different approach to deciding how many crossings there should be.

Risk management may take advantage of the fact that the line sees passenger trains only at relatively low speeds. If desired train speeds may be reduced further with little inconvenience.

Minimising risk at new pedestrian crossings

Risk can be reduced to a very low or negligible level by:

- a train operating system in which the crossing must be proved clear after the gate is shut before a train is allowed to approach - to avoid danger to a person trapped on the closed crossing;

- powered gates, with appropriate paths and fences - to discourage people from trying to bypass the closed gate or cross away from the crossing.

The risk to pedestrians from a well-managed crossing is arguably far less than the risks which are accepted every day from traffic in the surrounding streets.

New pedestrian crossings create no risk to Railcorp passengers, staff or property.

Minimising risk at new motor crossings

Risk can be reduced to a negligible level by:

- a train operating system in which the crossing must be proved clear after the boom is shut before a train is allowed to approach - to avoid danger to a trapped vehicle;

- median strips - to prevent vehicles zigzagging around a closed half boom.

The main risk is that a vehicle queuing illegally on the tracks is trapped when the boom falls. New crossings, by increasing total road capacity, will spread traffic and

[8] Railcorp's policy is that applicants for new licensed crossings should pay the entire installation and maintenance cost: RIC 2001:11.

so reduce queues. **This will probably reduce the risk exposure of Newcastle City crossings in total** (SKM 2001:12,34).

The risk that an accident derails a train can be made negligible by setting a suitably low train speed. In Newcastle City this can be done with little inconvenience, as train speeds are low in any case.

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NOTES

NTBD is a not for profit organization of professionals, which includes a town planner and professional economist, whose special area includes transport and development economics. None of us is acting for clients, employers or any other person or organization, in this rail issue and we do not stand to gain financially from the rail staying or going, nor from any development proceeding or not proceeding.

We are interested in doing what we can to ensure that Newcastle has the best transport configuration to meet business, development, social and community needs for at least the next 50 years.

The primary author of this proposal is Bruce McFarling who has a PhD in Transport & Development Economics and has lectured at the Newcastle Graduate School of Business and currently resides overseas.

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PEER REVIEW

This submission is indicative only and is not promoted as resolving all the technical issues or establishing definitive costs. All costs are indicative only.

The proposal has been reviewed and assessed by transport and development consultants and experts some of whom may choose to remain anonymous for commercial in confidence reasons.

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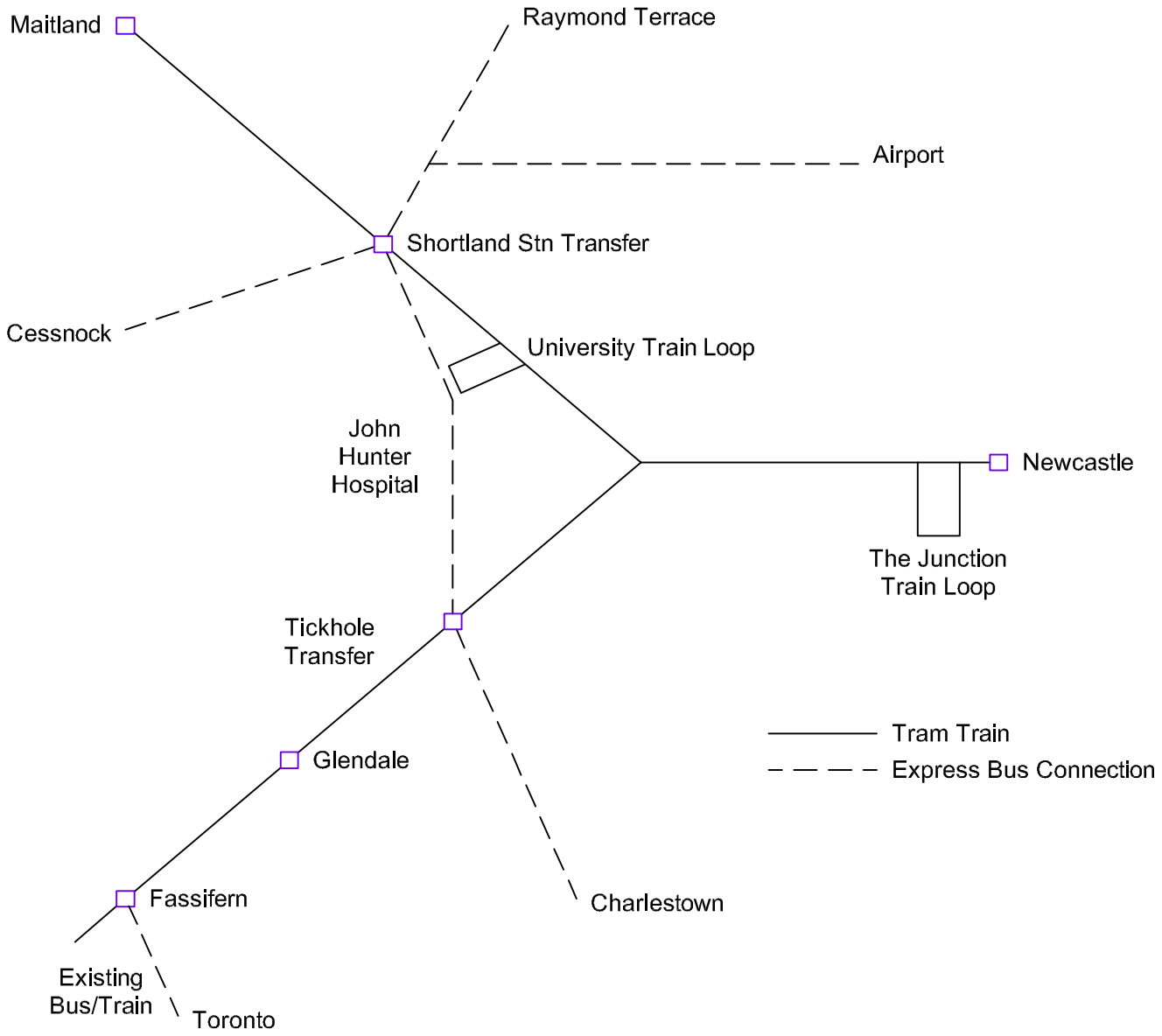
Proposed Newcastle Tram Train Network

Schematic Layout



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