

NEWSLETTER No 4/2008



Railway Technical Society of Australasia
SA Chapter
Engineering House, Bagot Street
NORTH ADELAIDE SA 5006

April 2008
NEXT MEETING

Next Meeting – 1st May 2008

The next meeting of the RTSA - SA Chapter will be held on **Thursday 1st May 2008** at The Chapman Hall, Engineers Australia Building, Bagot Street, North Adelaide commencing at 5.30pm. The topic of the meeting is:

Rail Maintenance Activities in Adelaide

and will be presented by

Dave Carlton – Bombardier

and

Brett Baker - TransAdelaide

Dave Carlton will identify the challenges, the approach to maintenance management and discuss the progress made by Bombardier with a mature asset such as the TransAdelaide railcars.



The presentation will discuss the work scope of the TransAdelaide contract, the KPI 's of availability, reliability and the various technical issues that have been encountered.

The presentation will highlight the various activities involved with the recent refurbishment of the 6 off 2000/2100 railcars which had been retired for 9 years. These railcars have been successfully returned to traffic with some pleasant improvements to the interior

layouts meeting latest DDA compliancy and providing a cleaner more modern passenger environment.

The pending 3000/3100 refurbishment which will see these cars given a number of improvements to the interior and other systems, notably Passenger information and doors will also be discussed.

Brett Baker, TransAdelaide's Fleet Engineering Manager will support Dave Carlton by discussing various aspects of the railcar refurbishment and their future in greater detail, with emphasis on that related to TransAdelaide's revitalization.

Prior to the meeting, light refreshments will be served.

Continuous Professional Development (CPD)

Engineers Australia members are reminded that attendance at RTSA technical meetings contribute towards CPD requirements. Each RTSA technical meeting generally has a value of 1 CPD point.

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LAST MEETING

The last meeting was a presentation by Gareth Evans, Manager, Public Transport Investment and Planning, Department for Transport, Energy and Infrastructure, Policy and Planning Division on "Seaford Rail Extension". The paper below is based on the presentation.

The meeting was attended by 27 members and visitors. Robert Schweiger gave the Vote of Thanks.

EXTENSION OF THE NOARLUNGA RAIL LINE TO SEAFORD



South Australia's Strategic Plan is a comprehensive statement of what South Australia's future can be. Its targets aim for a growing and sustainable economy and a strong social fabric. Some of these targets are ambitious and are beyond the reach of government acting alone. Achieving the targets requires a concerted effort not only from the State Government, but also from local government, regional groups, businesses and their associations, unions, community groups and individual South Australians.

This vision for SA's future requires infrastructure and a transport system that maximise South Australia's economic efficiency and the quality of life of its people. The ambitious increases in population and strong economic growth reflected in these targets will lead to increasing pressure on the supply of housing, offices, appropriately skilled labour and, critically, transport. Investing in strategic infrastructure for metropolitan Adelaide's transport system and services to increase its capacity, reliability and overall performance will help meet the challenge of rising travel demand.

Strategic Rail Infrastructure

Development of a rail line to Seaford and further south to Aldinga, Sellicks Beach and even to Victor Harbor has been contemplated for at least 50 years. The

Report on the Metropolitan Area Adelaide 1962

considered a rail extension to Sellicks Beach as an option for major public transport improvements, but eventually recommended the extension of the rail line to Noarlunga.

Initial work on a possible extension commenced in the mid 1970s during the time of the construction of the Lonsdale to Noarlunga Centre rail line, with the most direct route for a rail alignment from Noarlunga to Seaford being defined during the 1980s. Further consideration occurred in the late 1980s during the initial structure planning for the urban development at Seaford. This resulted in a transport corridor being reserved within this development.

In March 2005 the Government released the *Strategic Infrastructure Plan for South Australia* which initiated an investigation into the extension of the Noarlunga rail line to Seaford as part of a suite of infrastructure interventions to encourage the shift to rail transport for passenger and freight movements where justified by environmental, economic or social imperatives. This report describes the development and evaluation of the extension of the Noarlunga rail line to Seaford to establish its economic and engineering feasibility and its impact on the objectives in the *South Australia's Strategic Plan*.

The proposal incorporates a grade separated double track alignment except for a section of single track rail line over the Onkaparinga Valley.

The forecast for demand for public transport uses the population projections for the Outer South, which are based upon the *South Australia's Strategic Plan* target of increasing the population of South Australia to two million by 2050.

To meet this demand the supply of public transport services were evaluated based upon minor changes to bus services and extending rail services to Seaford.

The National Guidelines for Transport System Management in Australia (2nd edition)

These series of documents were endorsed by the Australian Transport Council (ATC) in November 2006. They support transport decision-making and serve as a national standard for planning and developing transport systems. They are a key component of processes to develop and/or appraise transport proposals that are submitted for government funding.

The guidelines provide a consistent framework and processes, methods and tools to assist and guide transport planning and decision-making across

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Australia. A need for the guidelines was identified by the Standing Committee on Transport (SCOT) in 2003.

The Council of Australian Governments (COAG) endorsed the implementation of the Guidelines in April 2007 as part of the COAG National Reform Agenda. The revised second edition includes guidelines on urban transport, which have been used as the basis for this investigation.

A multi-criteria approach was used to appraise the impacts of extending the Noarlunga rail line to Seaford and is based upon the above guidelines. The multi-criteria assessment allows the comparison of options against a range of impact areas which emphasises the six interrelated objectives of the *South Australia's Strategic Plan* which are:

- 1 Growing Prosperity**
- 2 Improving Wellbeing**
- 3 Attaining Sustainability**
- 4 Fostering Creativity and Innovation**
- 5 Building Communities**
- 6 Expanding Opportunity.**

The key results of these studies are:

GROWING PROSPERITY

Economic Growth and Transport Benefits

South Australia's Strategic Plan's economic objective of growing prosperity provides the following target:

T1.1 – Economic growth exceed the national economic growth rate by 2014.

The demand for additional public transport services in the outer southern areas of Adelaide will come from the attraction of this service, being quicker, more comfortable and more reliable compared to travel on a road network that becomes more congested over time.

Reduction in road congestion and quicker more reliable journeys to work and business on public transport will contribute to South Australia's economic growth and enhance opportunities for job creation and industry development.

This initiative will contribute to the better economic performance of South Australia and provide resources to achieve environmental and social goals. The key transport benefits that would influence economic growth in South Australia are:

- i) The current analysis of the effects of a rail service to Seaford indicate that a large number of people are expected to use the system with a predicted

mode shift from car journeys to public transport journeys of around 2.3 per cent.

- ii) Forecast additional public transport demand of up to 1.5 million public transport trips per annum (5,300 additional weekday trips) compared to continuing with the bus-based system to connect the outer south with the Noarlunga Centre and destinations further north such as Lonsdale, the inner suburbs of Adelaide and the City.
- iii) Reduced public transport travel times by up to 80,000 passenger hours and reduced car passenger travel times by up to 400,000 passenger hours because of projected net reductions in highway use that arise from a mode shift away from car use to public transport.
- iv) An increase in public transport use of around 10 million passenger kilometres per year. Private transport use would reduce by up to 30 million passenger kilometres per year.
- v) In sustainability terms extending a rail service to Seaford would reduce the use of the whole transport system by 20 million passenger kilometres per year.
- vi) Extending rail services to Seaford would enable and stimulate more and longer travel on public transport due to less reliance on car travel as the main mode of travel.
- vii) During the peak hours, parts of the road network are close to capacity where additional road vehicles eventually slow traffic flow and increase travel times of other vehicles. Extending a rail service to Seaford becomes an effective congestion relief mechanism improving the capacity of the road network.

Employment and Population

The population projections used in the MASTEM model correspond to the *South Australia's Strategic Plan's* target T1.22 of increasing South Australia's population to two million by 2050.

Intense, comprehensive development around rail stations can engender synergy between major transit schemes and major urban development schemes. Urban development in Seaford Meadows and at Seaford could be mixed use for local services with rail services to Seaford providing access to a wider range of goods and services at major regional centres such as Noarlunga, Marion and the City of Adelaide.

Policies that include offering incentives and aligning planning policies toward transit-oriented development have been successfully implemented in Perth.

Specific benefits of this proposal are:

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- i) Increasing residential density will increase the population within the catchment area for the Seaford Meadows and Seaford Stations. This benefit is valued in terms of journey timesavings for people who use the rail service to travel to employment areas further north, such as Lonsdale or the city.
- ii) Urban consolidation benefits estimated as the net savings in housing and associated infrastructure cost from higher density Transit Oriented Development (TOD) style of development at Seaford Meadows and at Seaford compared to development on the fringes of the outer southern areas of Adelaide. This benefit has not been monetised because no market take-up analysis has been undertaken to determine if the changes are real increases and not movements from one area to another, such as an increase in development in Seaford at the expense of other areas of Adelaide.
- iii) Property price uplift attributable to new rail extensions and transit-oriented developments. There is a body of research that proposes that fixed rail systems provide a scale of investment that may have identifiable impacts on land values over time when compared to bus-based systems, which are less likely to have any measurable impact. This research proposes that new or improved fixed rail systems increase land values which reflect the pressure for development within the vicinity of fixed rail systems and that these can be considered a value added benefit additional to the journey time benefits accruing from a new rail system. These benefits have not been monetised.

IMPROVING WELLBEING

Road Safety

New passengers to public transport will benefit from the inherent safety advantage of bus and rail travel compared to car travel. The remaining road users will benefit from a reduction in the number of road accidents due to fewer cars on the metropolitan road network, leading to less congestion and smoother travel.

The contribution of the extension of the Noarlunga Rail Line to Seaford to reducing accidents has been calculated on the basis of deriving unit crash cost information for fatal crashes and casualty crashes and then combining them with estimates of crash numbers, themselves generated by combining traffic and crash rate information, to estimate aggregate annual crash costs for base case and project case options. It is

estimated that this proposal will reduce the number of casualty crashes by up to 20 per year and reduce fatality crashes by up to one every three years.

Statewide Crime Rates

Investment in new public transport infrastructure presents the opportunity to provide public transport passengers with improved secure journeys so that passengers feel safe and crime on public transport is reduced. This requires ongoing funding for adequate security measures, including monitoring of CCTV cameras and alarms as well as adequate lighting, help phones and communication facilities.

These may be combined with other measures to improve security such as good urban design and locating stations to ensure that they have regular activity overlooking the facilities to provide passive surveillance that deters antisocial behaviour.

Providing secure car parks to prevent damage to vehicles and prevent stealing of vehicles improves the security for public transport passengers.

Preventative Health and Healthy South Australians

Extending the rail services to Seaford and linking these with feeder buses is forecast to generate an additional 1.5 million public transport trips per annum created largely due to car drivers and passengers switching to public transport. Each trip has a walking component to and from the destination to access and egress public transport vehicles. Public transport stops are located on average every 500 metres and it is estimated that people transferring from car travel to public transport would walk up to an additional 1.5 million kilometres per year. This active travel will help lessen the health problems caused by obesity.

Transport generates air pollution emissions that give rise to discomfort and adverse health effects, and affects ecosystems, buildings and general amenity. Pollution studies have shown that high levels of ambient air pollution are associated with strong increases in adverse health effects, including premature death, and respiratory and cardiovascular problems. The evidence for these effects is strongest for particulates and ozone and the relationships are widely accepted as causal.

Recent studies reveal such effects occur at the levels of ambient air pollution present in urban areas today and are sufficient to trigger these health effects. Reducing local air pollutants within the outer south of Adelaide will have a direct positive effect on those people working, living in and visiting the outer southern areas of Adelaide.

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It is estimated that extending rail services to Seaford represents a significant benefit with a reduction in local air emissions of up to 180 tonnes per annum.

ATTAINING SUSTAINABILITY

Greenhouse Gas Emission Reduction

There is a growing body of evidence that links manmade greenhouse gases with global warming. Greenhouse pollutants produced by road transport are reported in terms of carbon dioxide (CO₂) equivalent emissions. The results of the evaluation indicate that the extension of a rail line to Seaford would decrease the amount of global air pollution emissions from a shift from private car to public transport. Reducing greenhouse air emissions will have a direct positive effect on everyone.

It is estimated that extending rail services to Seaford represents a significant benefit with a reduction in greenhouse emissions of up to 9,500 tonnes of carbon dioxide per annum.

Use of Public Transport

South Australia's Strategic Plan provides the following target: T3.6 – Increase the use of public transport to 10 per cent of metropolitan weekday passenger vehicle kilometres travelled by 2018.

Transport use is measured in terms of passenger-kilometres travelled on both public and private transport within metropolitan Adelaide. As such, it is a very useful measure of the effectiveness of policies to encourage a shift from private to public transport.

It is estimated that a rail service to Seaford will increase the use of public transport by up to 0.17 per cent of metropolitan weekday passenger vehicle kilometres travelled.

Ecological Footprint

Reduction in use of the transport network through a modal shift of private car travel to public transport will eventually lead to the reallocation of urban space from the use of cars on a road network to more community space for attractive pedestrian areas and access to local areas through the use of walking and cycling.

BUILDING COMMUNITIES

Access to Everyday Facilities

The community severance impacts of a rail extension to Seaford are based upon forecast changes in traffic

flows on the main roads predicted with the passenger demand forecasting model used in this analysis.

Community severance is measured in terms of pedestrian delay. Pedestrian delay when crossing a road is mostly the result of the waiting time for a suitable gap in the traffic or for a traffic signal phase that allows pedestrians to cross safely.

The assessment shows that extending rail services to Seaford with connecting bus services is forecast to bring about a significant overall net reduction in cars using the road network because of the modal shift from private to public transport.

Noise

Traffic is one of the principal sources of urban noise and the train extension to Seaford would provide considerable benefits in terms of reductions in the amount of cars on the network as people shift to using public transport. The reduction in car traffic would lead to a reduction in general traffic noise.

Natural Environment

Initial evaluation of the alignment has determined the preference for a viaduct and bridge over the Onkaparinga Valley tidal estuary to minimise the impact on the tidal flats and impact on peak tidal flows and flooding. An earth embankment at this stage is not considered feasible because of the negative environmental impact on tidal flows and a poor foundation within the soft alluvial deposits.

There is an opportunity to restore the flora and fauna within the floodplain compared to what exists currently if the SA Water effluent evaporation ponds are rehabilitated and the 66kV power lines are relocated to facilitate the building of a rail viaduct and bridge over the tidal flats.

EXPANDING OPPORTUNITY

Reduction of Barriers: Mobility Impaired Access to Public Transport

The new railway stations will be compliant with the Federal Disability Discrimination Act, which provide for easier accessibility for everyone, particularly for those in wheelchairs, parents with prams and mobility impaired passengers. Connecting bus services will be within quick and easy walking distances to rail services.

Results of the Economic Evaluation

The results of the sensitivity analysis are summarised in the table below and show a variation of results for the economic return of the project that are dependent upon

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the assumptions made for the estimate of infrastructure costs and journey time savings.

Table 1 Results of Sensitivity Tests

| | Benefit Cost | Net Present Ratio Value \$ millions |
|--|---------------------|--|
| 1 1980s Alignment P90 infrastructure cost estimate, 6% discount, 100% road decongestion benefit | 0.7 | -71.4 |
| 2 Item 1 using a different base case that provides faster train running time between Noarlunga and Adelaide | 1.0 | -25.6 |
| 3 Item 1 using a discount rate of 4% | 0.8 | -46.8 |
| 4 Item 1 using a discount rate of 10% | 0.5 | -89.4 |
| 5 Item 1 using most likely estimate Infrastructure cost estimate | 0.8 | -41.0 |
| 6 Item 1 using 50% road decongestion benefit | 0.5 | -103.0 |
| 7 1980s Alignment P90 infrastructure cost estimate, 6% discount, 100% road decongestion benefit, double track over Onkaparinga Valley. | 0.6 | -100.6 |
| 8. Westerly Alignment P90 infrastructure cost estimate, 6% discount, 100% road decongestion benefit, single track over Onkaparinga Valley. | 0.6 | -84.4 |

No sensitivity testing was undertaken on a range of population projections for the outer south. The preliminary benefit cost ratio (BCR) range is between 0.5 and 1.0. The P90 value has been derived from the range in cost items within the estimate and represents a 90% probability that the estimate will be within the range estimate. This means that there is a 10% probability that the P90 figure will be exceeded because of these uncertainties.

There is a significant improvement in the economic result if rail services are extended to Seaford after concrete re-sleepering of the Noarlunga to Adelaide rail line. This would provide faster train services and increase the BCR from 0.7 to 1.0.

KEY ISSUES

Key issues raised by this investigation are outlined below:

- i) Further development of the proposal is needed to remove uncertainties in the costs. There are a number of uncertainties and a number of unit rates that are considered to have a low level of confidence in their accuracy. Further planning and design work is required to quantify the extent of road works, to fix the horizontal and vertical alignment and to develop preliminary cross sections within the rail corridor.

Preliminary bridge design and geotechnical information is required to remove the uncertainties associated with the type of structure and foundations needed for the viaduct and bridge over the Onkaparinga Valley and their costs.

- ii) Single track vs double track bridge over the Onkaparinga Valley. TransAdelaide has expressed the view that the single track layout over the Onkaparinga Valley will affect the reliability of the Seaford to Adelaide rail service. The risk is that this arrangement may affect TransAdelaide's ability to keep to a specific timetable and also affect the effectiveness of connecting bus services. Independent studies propose that it is possible to operate the current train timetable with an extension to Seaford incorporating a single track over the Onkaparinga Valley.

Operational flexibility and reliability of the public transport system is a critical issue in retaining passengers and encouraging new passengers. Understanding whether a single track bridge will compromise this ability is a critical issue for resolution during the project definition phase. Further studies are required to investigate the effect of a single track over the Onkaparinga Valley on the reliability of the operation of the Seaford to Adelaide rail line. This information can

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then be used to decide whether a single track arrangement can be implemented over the Onkaparinga Valley with duplication occurring at some time in the future if passenger demand increases.

- iii) The Seaford and Seaford Meadows Stations are too close. The Seaford Meadows station is only 1.5 kilometres from the Seaford terminus. Removing the Seaford Meadows station or investigating other options to space stations so that quicker transit running times can be achieved, may attract more passengers.

Spacing between stations is a balancing act. The stations need to be close enough to be easy to reach from many areas in the outer south either by walking or travelling a short distance by bus. However, there is a need to keep the train moving on the line, since stopping too often will make the trip a slow one and the service will be less attractive for passengers.

Remove Seaford Meadows:

Removing the Seaford Meadows station, which is located in a hollow, provides quicker and a more reliable transit time between Noarlunga and Seaford by not requiring trains to both brake and accelerate out of the station against the grade in both directions. There is possibly some advantage, from a public transport perspective, that faster train services on the Seaford to Adelaide rail service will attract additional patronage. Buses would service the Seaford Meadows development and feed passengers into the Seaford terminus.

Removing the Seaford Meadows station will reduce walking access to the rail service and reduce the opportunity to develop Transit Oriented Development (TOD) style neighbourhoods. The Seaford terminus becomes the main train loading point for the Outer South and there may not be sufficient car parking to cater for a growing public transport demand and the terminus may become congested with feeder buses.

A Seaford Meadows station may be preferred by developers who have the opportunity to develop TOD-style neighbourhoods that provide high density and premium developments close to and within easy walking distance of the Seaford Meadows station.

Relocate Seaford Terminus to Seaford Heights:

There is possibly some benefit in retaining the Seaford Meadows station and relocating the Seaford terminus to Seaford Heights. The stations would then be 2.75 kilometres apart allowing quicker transit time between stations. The Seaford Heights terminus would be located adjacent to the large greenfield residential site of Seaford Heights. This proposal has the advantage of stations being located adjacent to two large residential catchments of Seaford Rise and Seaford Heights that are within easy walking distance to rail services.

There is potential to develop TOD-style neighbourhoods at Seaford Heights, which is a greenfield site, close to the rail terminus further increasing the potential catchment for rail services. Relocating the terminus to Seaford Heights would require an additional 1.75 kilometres of rail track in a rail corridor that is under the ownership of the Minister for Transport. This increases the scope and cost of the proposal and will reduce the economic result unless rail and bus services can attract more patronage through higher frequency services and quicker train running times along the Seaford to Adelaide rail corridor and/or the population catchment exceeds estimates.

These benefits remain speculative in that no analysis or modelling has been undertaken to quantify the effects of removing the Seaford Meadows Station or relocating the Seaford terminus to Seaford Heights.

- iv) Seaford Meadows Master Plan needs to be developed. The developer for Seaford Meadows is required, under the development deed, to prepare a master plan for its proposed development, which in turn will inform a review of the Structure Plan with the City of Onkaparinga. DTEI understands that the developer has developed two master plans for Seaford Meadows.

One that assumes that a railway station is built with development allowing for bus access to the station and a TOD-style neighbourhood with higher residential densities near the station. The other plan assumes that there is no station and no TOD-style neighbourhood and is developed with standard street arrangements.

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Developers may require a decision from the Government on the determination of a station at Seaford Meadows within the next four years.

- v) Links between MASTEM predicted additional trips and population increase are unclear.

MASTEM, a passenger demand forecasting model, has not been sufficiently developed to produce automatic outputs that can show the relationship between population increase and public transport demand and origin and destination of specific trips. Further work should be done to confirm the benefits of the proposal using updated versions of MASTEM with a number of population scenarios for the outer south and with spatial diagrams to show the origin and destination of trips.

- vi) Corridor land is State Government owned but titled under different Ministers.

The 1980s alignment over the Onkaparinga Valley is on land owned by the Department for Environment and Heritage and SA Water. The remainder of the alignment is on land owned by the Minister for Transport or Commissioner for Highways. No land costs have been included in the estimate to provide for cross-departmental funding transfers to account for the change in ownership of the land.

CONCLUSIONS

The main conclusion reached by the study is that the proposal does not yet justify the major initial expenditure. However, extending rail services to Seaford after concrete re-sleepering of the Noarlunga rail line provides an improved benefit cost ratio and offers the best value for money.

A rail extension to Seaford would provide a range of benefits. Despite the main conclusion, the results of the multicriteria assessment show that the majority of the criteria set to evaluate the rail extension to Seaford would be met. Significant benefits would be realised in terms of improving accessibility to and from the outer southern areas of Adelaide as well as improving the environment.

The provision of a rail service to Seaford would encourage a large number of people to use the system. The improved accessibility, especially between the outer south and inner south, would help the people from the outer south areas to have better access to job opportunities located north of Seaford. The rail line would also encourage Transport Oriented Development

(TOD) style of neighbourhoods and encourage development within Seaford and Seaford Meadows. The predicted modal shift in journeys of up to 2.3 per cent from private transport is extremely encouraging, given the reliance on private car travel in the outer southern areas of Adelaide.

The results of the preliminary approval and benefit cost ratio are detailed in Appendix A and summarised in Figure 1. Analysis of the benefits of a rail extension show an attraction to a quicker, more comfortable and more reliable service compared to travel on a road network that becomes more congested over time.

The main beneficiaries are car drivers who remain on the highway system. These benefits are achieved by the extension of rail services to Seaford providing a significant shift of transport travel from the road network to the public transport system.

The preliminary benefit cost ratio (BCR) range is between 0.5 and 1.0.

There is a significant improvement in the economic result if rail services are extended to Seaford after concrete re-sleepering of the Noarlunga to Adelaide rail line. This would provide faster train services and increase the BCR from 0.7 to 1.0.

**Figure 1 Costs and Benefits Present Value
\$Millions**

| \$202 Million | Costs |
|--|--------------|
| Benefits to car drivers who remain on the road network | 63 |
| Road crash cost savings | 25 |
| Benefits to car drivers who shift to public transport | 13 |
| Revenue | 10 |
| Journey time saving to existing public transport users | 9 |
| Emissions | 7 |
| Noise | 3 |
| Avoided car ownership | 1 |

The 1980s alignment, the most direct route from Noarlunga to Seaford, performs better than the Westerly Alignment when compared to the appraisal criteria.

The Westerly Alignment underperforms when compared to the 1980s alignment in a number of key areas because it:

- i) Is more costly.
- ii) Requires more land from the Onkaparinga River recreation park.
- iii) Requires the demolition of a number of private properties.

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A rail extension would offer an attractive alternative to the private car.

Improving the quality of public transport, particularly by reducing journey times through the introduction of extended rail services along a dedicated corridor to Seaford, would provide an attractive alternative for people who currently use cars or would otherwise consider using private cars in the area in the future.

Extending rail services to Seaford shows a net reduction in car passenger kilometres resulting from car drivers and passengers shifting to public transport because of higher road traffic congestion and less distance travelled on the road network. The extension of rail services to Seaford is expected to increase the use of public transport by up to 0.17% of metropolitan weekday passenger vehicle kilometres.

Improvement in rail services between Noarlunga and Adelaide would provide an improvement in the economic result.

Travel time along the Noarlunga to Adelaide rail line is currently affected by speed restrictions. Without intervention, further speed restrictions would result in increased travel times that may lead to reduced performance of rail services. Improving this situation through concrete re-sleeping of the rail line will provide faster and smoother train services and extending the rail line to Seaford with these improved train services produces significantly higher benefits. These benefits are generated from the increased attraction to this service, being quicker, more comfortable and more reliable compared to travel on a road network that becomes more congested over time.

Extending rail services to Seaford after concrete re-sleeping of the Noarlunga rail line provides an improved benefit cost ratio and offers the best value for money.

The proposal is technically feasible.

The proposal is feasible within the defined scope of works described in this report. There are a number of uncertainties and a number of unit rates about which there is a low level of confidence in their accuracy. These uncertainties exist because either the unit rate is speculative in nature or because design attributes have yet to be fully defined and the estimator cannot fully quantify their impact because of lack of information or because their likelihood of occurring cannot be ruled out.

Further planning and design work is required to quantify the extent of road and rail works, to fix the horizontal

and vertical alignment and to develop preliminary cross sections within the rail corridor.

Preliminary bridge design and geotechnical information is required to remove the uncertainties associated with the type of structure and foundations needed for the viaduct and bridge over the Onkaparinga Valley and their costs.

Consultation with a number of key external stakeholders is also required to secure the rail corridor across the Onkaparinga estuary.

The estimates of capital costs are predictable within certain ranges.

The 2007 range estimate for the cost of infrastructure is between \$136 million and \$175 million. If the proposal includes a double rail track viaduct and bridge over the Onkaparinga Valley the range estimate is between \$170 and \$215 million.

An estimated additional 14 railcars would be required, depending on the service levels adopted to meet passenger demand, at a cost of \$56 million.

RECOMMENDATIONS

This investigation shows that extending rail services to Seaford provides a benefit cost ratio (BCR) between 0.5 and 1.0. With other benefits assessed by the evaluation criteria the investigation demonstrates that the scheme is worthy of implementation at a future time if rail services are improved and if population estimates for the southern areas of Adelaide remain the same or are higher than current predictions.

It is therefore recommended that:

- i) The Seaford Rail extension be retained as a potential public transport project.
- ii) The 1980s alignment, the most direct route from Noarlunga to Seaford, be the adopted route for a future rail extension to Seaford.
- iii) The costs and benefits of providing a station at Seaford Meadows or the relocation of the Seaford Terminus to Seaford Heights be reviewed.
- iv) The feasibility and priority for funding of the proposal be reviewed:
- v) After concrete re-sleeping of the Noarlunga to Adelaide rail line is complete.
- vi) If high frequency and high speed rail services and other public transport priorities are approved.
- vii) Once the population increases in the southern areas of Adelaide.

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- viii) The rail corridor over the Onkaparinga Valley be secured in the name of the Minister for Transport.
- ix) A rail corridor to Aldinga be identified.

to Epping. This line will add three new stations to the network, two of which could be quite busy (the third is wedged between an industrial site and a cemetery). Unlike the Airport line this new line will not provide capacity relief for the Western line, as was originally envisaged, since only the eastern half has been completed and, like so many other rail projects, will presumably stay that way.

So in a period of almost 70 years (post Cronulla) Sydney has gained 15 new commuter railway stations, almost a third of which are low patronage. Apart from the Eastern Suburbs line, which I would guess would add quite a noticeable number to the annual passenger journeys, the rest of these new stations would represent a fairly minor blip on the big picture view of the network. In fact electrification of existing lines beyond the original suburban boundaries (Sutherland, Liverpool, Parramatta and Hornsby) to areas progressively consumed by the uncontrolled appetite for housing land has undoubtedly contributed far more to the passenger count, offsetting the fall off in inner city use of rail. The reality however is that there has been hardly any real 'reach' added to the network in three quarters of a century. And for the same reason the passenger numbers have been relatively stagnant when measured against population growth, and in fact have been largely static for several decades now.

THE OBSERVATION POST – Max Michell

(Editors Note – The Observation Post has been reproduced from the RTSA NSW Chapter Newsletter with due acknowledgement.)

Sydneysiders were probably not aware of the situation back in the mid 1920's, at the time when electric trains were first introduced to the system, but the city rail network that they knew then would only change marginally in the next 80 years. In the first 15 years or so of the electric network's existence the Harbour Bridge and East Hills lines were 'completed' and Cronulla line built. Other than that there was minimal activity, except for completion of the city circle through Circular Quay (propelled by a rabid desire to expunge trams from the city) for the next thirty years. Then in a rush of something, the Eastern Suburbs line (the first part, but now probably only part) was opened with four new stations – one of which was a city station. The three non-city stations (Bondi Jn, Edgecliff and Kings Cross) are all high patronage stations with two almost certainly among the busiest stations on the network. Then there was a lull until the East Hills – Glenfield line was opened some 10 years later, with just a single low patronage new station added to the network. Another decade later the Airport railway opened, providing five new stations – the two Airport stations (after a shaky start) and Wolli Ck are moderately busy while the other two are rather ho-hum. Mind you this line has always laboured under punitive fares and erratic service frequencies, choked in the peaks by long distance travellers, for this line was really a very expensive expansion of Southern line capacity, just coincidentally serving the airport. Go check the domestic and international air passenger numbers (both double digit millions) and then look at how many find their way into the 'basement de chemin de fer' – a big opportunity for someone tuned in to business rather than money. At the same time the Olympic Park rail line was built as a special purpose line serving what is mainly an events complex rather than for conventional commuter needs. Now, almost another decade further on we are looking at the next new line coming to completion – Chatswood

Perth on the other hand has shown and is showing how these things can be changed as a result of planning, fired by political vision and competence, and coupled with a well chosen project team. (Surely you don't feel depressed at this early stage??)

Perth had a three line heritage network operated by dodderly old diesel railcars handling passenger numbers of around 10 million p.a. in a good year. This 'un-good' system fell foul of the usual Government deep thinking and the Fremantle line was closed (but not for freight, thank goodness) after which the then remaining two suburban lines looked decidedly threatened. A change of Government at just the right time brought Fremantle back into the network, but more importantly brought a new railway serving the northern suburbs (the Joondalup line) along with electrification of all four lines. The new line was designed for high speed and high frequencies and was mainly located in the centre of a freeway with stations spaced several km apart to allow very fast transit times by Australian standards. Such was the success of this venture that another new line, this time southwards to Mandurah, was conceived – which over time and with some intermediate route changes, has just come to fruition. This new line is over 70 km long yet the trains (every 10- 15 minutes) take

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just 49 minutes for the journey. Once again the waste land in the centre of freeways has provided much of the route – so much so that Perth now has 50 km of high speed (130 km/h) median strip railway in its rail network.

The measure of success has been growth in passenger numbers to around 40 million p.a. prior to Mandurah, driven by a combination of electrification (comfort, speed, frequency, convenience) and the Northern line with its extension into a new catchment for rail, which in turn has facilitated growth along that corridor.

Early reports from Perth are that patronage on the Mandurah line, which is barely three months old, is running at 40,000 per weekday – equivalent to over 10 million passengers journeys per year – equivalent to the total activity only 20 or so years ago. This is three times the patronage of the former bus routes that rail replaced which suggests that somewhere around 25,000 car trips per day have been diverted to rail almost instantaneously. Assuming that the new Mandurah railway encourages population growth along this extended corridor it is entirely reasonable to assume that Perth rail passenger numbers in the not too distant future may well be double those that were achieved only a few years ago, and may well approach 10 times the numbers that were being carried at the network nadir back only a couple of decades ago.

Perth admittedly had a very small and relatively ineffectual suburban system prior to its Phoenix like revival. As was demonstrated when the Fremantle line was closed the passenger loadings then could be handled by bus, albeit with some emotional damage among the government's constituents. But rather than just follow a simplistic line self destructive policy toward eventual closure, a decision was made to revive and significantly improve the rail system as part of an overall plan to direct the future for Perth as a city. In effect transport infrastructure is now in place to allow relatively efficient city growth and development between the Darling Ranges and coast in an east - west direction (maybe 25 km in a straight line) and between Mandurah and Clarkson in a north – south direction (over 100 km).

Maybe Sydney is 100 years ahead of Perth in urban rail development, with all the necessary infrastructure being in place decades ahead of its time to allow for the ultimate Sydney growth? Maybe Bradfield provided the only driving force for early rail development in Sydney, that simply died with him, rather than being picked up by another visionary? Maybe the culture of limited or zero proper planning over many years has allowed the rail network to stagnate rather than being developed as a tool for city enhancement? Maybe Sydney has just

become too fat and inefficient (as a city) to continue to grow in to evermore remote pastures on the fringes? For whatever reason urban rail development opportunities have largely been squandered here over many decades, with the result that we now have a rail network that is irrelevant to ever increasing numbers of city inhabitants. In part this situation can be attributed to the depression, an obsession of successive governments to rid Sydney of its trams without thinking through the issue of replacement, and a lack of big picture thinking, but more than anything else it has been the lack of charismatic visionaries able to grab the initiative and persist in ramming through big picture rail developments that would stand the test of time as city shaping infrastructure.

Maybe the time is coming, with little help from the visionless of Macquarie St, where a new paradigm can be launched and implemented in Sydney that at some stage in decades to come will be seen as a pivotal change in Sydney's development. One thing that stands out, at least to me, is that vast expenditure on rail links to fringe paddocks will not be that pivotal change. It has to come in the heart of the city and it has to allow population density growth as an alternative to population area growth if it to make the change in city developmental direction that will allow Sydney to grow sustainably and efficiently. There can be significant rail aspects to this future vision, but up to now they have not been proposed, at least in the public domain. The real rail development for this city has yet to see the light of day – the danger being of course that current and very recent proposals will become entrenched, warts and all, as 'the answer' without anyone really asking what the question is.

We need a robust debate on future directions (plural) for Sydney, complete with appropriate new rail developments, before the scrooge-balls in the Treasury run away with the agenda and impose their own version of vision on this cities luckless citizens.

APPLIED SCIENCE

(Courtesy RTSA NSW Chapter Newsletter)

A major research institution has recently announced the discovery of the heaviest element yet known to science. The new element has been named "Governmentium (Gv)."

Governmentium (Gv) has one neutron, 25 assistant neutrons, 88 deputy neutrons, and 198 assistant deputy neutrons, giving it an atomic mass of 312. These 312 particles are held together by forces called **morons**,

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which are surrounded by vast quantities of lepton-like particles called **peons**.

Governmentium is inert. However, it can be detected, because it impedes every reaction with which it comes into contact. A minute amount of Governmentium can cause a reaction that would normally take less than a second to take over four days to complete.

Governmentium has a normal half-life of four years; it does not decay, but instead undergoes a reorganization in which a portion of the assistant neutrons and deputy neutrons exchange places. In fact, Governmentium's mass will actually increase over time, since each reorganization will cause more morons to become neutrons, forming **isodopes**.

This characteristic of moron promotion leads some scientists to believe that Governmentium is formed whenever morons reach a critical concentration. This hypothetical quantity is referred to as **Critical Morass**.

When catalyzed with money, Governmentium becomes Administratium (**Am**) -- an element which radiates just as much energy as Governmentium since it has half as many peons but twice as many morons.

CORE 2008

CORE 2008 will be held in **Perth between 7th and 10th September 2008**. The theme of the conference is:

RAIL – THE CORE OF INTEGRATED TRANSPORT

And according to John Goodall, Conference Chairman, will highlight the successful role of rail in integrated transport systems in both urban travel and freight contexts. Further information may be found at www.core2008.org.

RTSA NEW WEBSITE

The RTSA has launched its new website. The new website covers all of the RTSA Chapters and provides an improved layout highlighting future meetings and reports from past meetings.

It is well worth a look at and may be found at:

www.rtsa.com.au

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MEETINGS FOR 2008

| Future Speakers/Dates/Topics | | | | |
|------------------------------|--------------------------------|----------------------------|---|--|
| <u>Date</u> | <u>Speaker</u> | <u>Organisation</u> | <u>Topic</u> | <u>Venue</u> |
| 1/05/2008 | Dave Carlton and Brett Baker | Bombardier & TransAdelaide | Rail Maintenance Activities in Adelaide | Chapman Hall, ENG AUST, Bagot St North Adelaide |
| 5/6/2008 | Randall Barry & Charles Irving | TransAdelaide | Upgrade of Noarlunga and Belair Lines | Adelaide Riviera |
| 3/07/2008 | TBA | DTEI | Relocation of Rail Car Depot | Chapman Hall, ENG AUST, Bagot St North Adelaide |
| 7/08/2008 | Graham Haywood | United Goninan | 92 Class Locomotives | Chapman Hall, ENG AUST, Bagot St North Adelaide |
| 7-10/09/2008 | | RTSA | CORE2008 | Perth WA |
| 15/09/2008 | RTSA Eminent Speaker | | TBA | TBA |
| 2/10/2008 | George Erdos | ASTB | Benalla Signalling Accident | Gill Langley Room, Adelaide Oval – Joint with IRSE and PWI |
| 6/11/2008 | TBA | | South East Railway Upgrade Project | Chapman Hall, ENG AUST, Bagot St North Adelaide |
| 25/11/2008 | | RTSA | AGM | Hyde Park Tavern |

Note: Meeting topics are subject to change. Please refer to future Newsletters for confirmation.

KEY RTSA CHAPTER COMMITTEE CONTACTS

| | | |
|--------------|------------------|--------------|
| Chairman | Duncan McLeod | 08 8338 7919 |
| Treasurer | Michael Forbes | 08 8217 4127 |
| Secretary | Daniel Martucci | 08 8204 8213 |
| N/L Despatch | Steve Torok | 08 8264 2552 |
| N/L Editor | Stephen Townsend | 0400 135 481 |

Articles or editorial comment for Newsletter are very welcome. We have over 100 members locally some of whom will have stories, events or developments of interest that could be reported in Newsletter.

Part of the function of RTSA is to keep members in touch with what is going on in the industry and with each other and to that end we are only too happy to publish items of interest.

Send copy to the Editor, Stephen Townsend at st771048@bigpond.net.au or fax to 08 8297 0992.

Electronic despatch of Newsletter is undertaken by Steve Torok – contact Steve on storok@tge.com.au if you have any problems receiving Newsletter electronically or in hard copy. Note that electronic subscribers will get their Newsletters and flyers as soon as the editorial work is done, while the hard copy mail will of course be some days slower.

For all other matters relating to RTSA SA Chapter contact Duncan McLeod (Chairman) at e-mail dmcleod@aapt.net.au, or by phone on 08 8338 7919.

Disclaimer

This Newsletter is a publication of the South Australian Chapter of the RTSA. The opinions expressed within are not necessarily those of the Chapter, Society or Editor.