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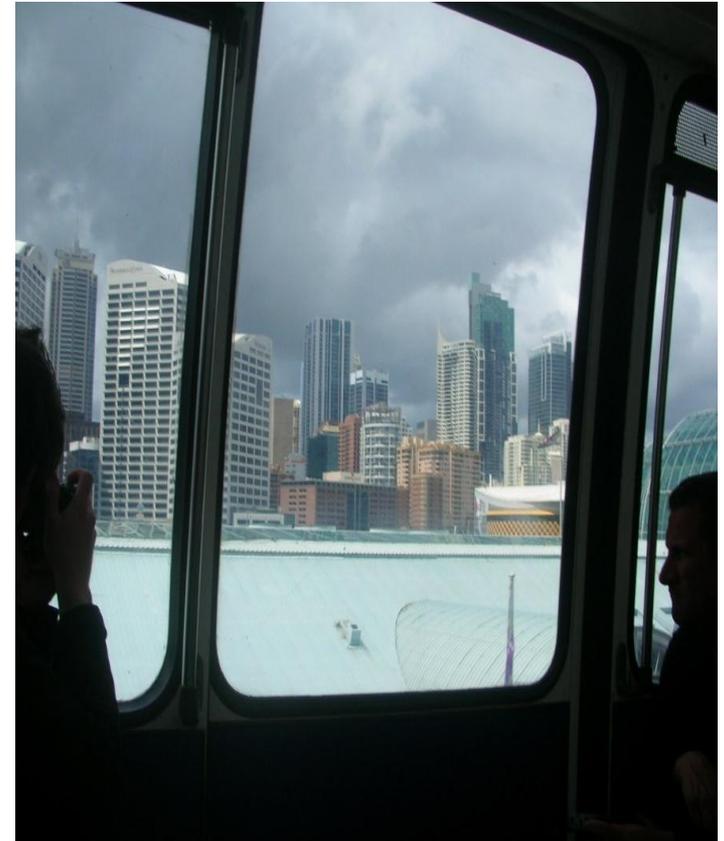
# Final Report of Rail Network Strategy Review

Prepared for  
Infrastructure NSW

11th April, 2012

# Table of Contents

- Executive Summary
- 1: Introduction
- 2: Background - trends, committed schemes & existing strategy options
- 3a: Towards an alternative train operating plan
- 3b: A potential train operating plan for 2031
- 4: A customer service plan
- 5: An operating efficiency plan
- 6: PPP options, risks & plan
- 7: Conclusions & way forward



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# Executive Summary

# Introduction

- Interfleet Transport Advisory has been retained by Infrastructure NSW (INSW) to advise on potential ways of optimising the performance of the CityRail network from an infrastructure investment perspective.
- This presentation summarises that advice, which has been further shaped by meetings with key NSW government stakeholders during the week commencing 12<sup>th</sup> March 2012.
- Much of our advice is consistent with current Transport for NSW (TfNSW) initiatives, including the Network Efficiency Plan and the draft Long Term Strategy (which was reviewed as part of this work).
- However, we believe that there are opportunities for incremental actions to be taken to improve capacity in the most heavily trafficked areas that would allow the \$5 billion CBD Relief Line (and the harbour crossing) to be deferred for 10 years or more, and that this approach can provide material service improvements at relatively low cost (i.e. it offers better value for money, noting also that these major capital investment projects are not deemed affordable over this timeframe).

# Introduction (continued)

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- We therefore recommend that for the next 5 years the focus should be on the operational improvement and reform agenda, along with improving the "customer experience". Over time, this has the potential to generate a greater "willingness to pay" within the community, and thus provide the foundations for a virtuous cycle of investment and improvement.
- We would welcome the opportunity to engage with TfNSW and further develop plans along the direction we indicate in this report.

# The position to date

- The draft LTRS (phase 5 report) highlights the list of strategic planning and operational reviews which have sought to shape rail's future in NSW since 1989.
- What typifies all reports to date is the centrality of big infrastructure solutions to the problems of growth and planning. In spite of continued predicted population and demand growth, we see this desire to plan and construct large rail projects as problematic, since:
  1. Concentrating attention on developing and promoting these solutions has allowed the necessary process of reform of CityRail operating practices to be deferred;
  2. The incremental steps that can be taken have not yet been implemented or assessed for impact
  3. The sensible integration of public transport modes, fare structures and ticket media has taken a back seat to big infrastructure at a time when Sydney is clearly falling short of international good practice in this area; and
  4. The technical, financial and operating risks associated with these larger schemes are yet to be fully understood but have, until recently, been pursued as an immediate priority.

# The position to date (continued)

- We remain further concerned about the nature of the solutions since:
  1. There is a reliance on relief and duplication of crowded routes instead of developing networks;
  2. There has been a reluctance to demand critical appraisal of the assumptions that cause certain schemes to be promoted. In particular we are concerned at the “Reduced Reliability” concept in the Base Case that would halve the BCR of the incremental options if removed;
  3. Investments tend to form a package of indivisible solutions that must be brought forward in a pipeline rather than a pool of flexible solutions that can be brought forward as necessary; and
  4. The capex cost to facilitate an incremental peak passenger movement in the 2036 Base Case is ~\$95k. For LTRS Phase 5 options this rises to \$280k upwards for each further passenger. \*
- Finally, we have seen no historic appetite for tackling the enormous existing operational subsidy levels to free cash for investment. We calculate that the subsidy for South West Trains (a similar scaled UK rail operation) is approximately 60c/passenger journey compared to the CityRail subsidy of some \$6/passenger journey. There are two reasons for this:
  1. A profoundly inefficient operation, well documented in LEK’s June 2008 report; and
  2. A low fare base (for a developed global city) and consequently weak price differentials make using ticket prices as a market signal ineffective ‘like pushing on string’.

\*The LTRS (Phase 5) 2036 Base Case lifts capacity in the peak 3.5 hours by 53% (from 316,900 pax to 483,500 pax) for capex spend of \$16bn, but the cheapest option (Modified Three Tier) only adds a further 12% capacity to 523,300 pax for an extra capital spend of \$11.2bn.  
Source: Long Term Rail Strategy, Strategic Economic Appraisal, Aug 2011, PwC report

# Realising change

We believe that there are immediate and practical steps to achieving a transformation in network performance that defers big infrastructure investment until the optimal time in the future whilst creating a virtuous circle of improvement to support investment. These steps comprise:

1. Making best use of station and track assets:
  1. Refining service patterns to reduce waiting time on platform,
  2. Better crowd and flow management to keep dwell times consistently low,
  3. Implementing modern signalling to increase capacity in the core route at an affordable price.
2. Creating a path to a new 2031 Plan which fully exploits the existing network by:
  1. Acknowledging the underlying logic of sectorisation and many of the building blocks of the 2031 Long Term Rail Strategy without pursuing the CBD Relief line until properly appraised against our more dynamic base case,
  2. Develop and deliver a high capacity, high frequency mass transit concept ('Metro-style') between Hornsby and Liverpool/Epping (via Strathfield),
  3. Providing over-crowding relief by using more of the relatively under-used assets of the City Circle and the interchange stations at Hornsby, Epping and Chatswood,
  4. Moving to single-deck trains that optimise load/unload times consistent with world practice, combined with Automatic Train Operation (ATO) in the core route.

# Realising change (continued)

3. Asserting a powerful customer vision and encouraging a service-driven rail system where Sydney-siders want to use rail and are prepared to pay a fair fare for their journey with:
  1. An attractive off peak service along key corridors,
  2. Competitive discounts for multi-mode and off-peak tickets,
  3. Compelling network journeys through non CBD interchange,
  4. A proper price for a ticket to those who use scarce peak capacity.
4. Re-structure to create smaller, effective management vehicles to demonstrate the value of sectorisation e.g. separating the Illawarra/Eastern Suburbs services from the rest of the network - followed by the other high capacity operations.
5. Create solutions that release the power of driven yet accountable management teams – using a mix of performance incentives, franchising, and ultimately privatisation as a force for further cost efficiencies in the system.
6. Contract a customer service culture that drives up the latent demand in the system freeing cash for future investment.

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# Chapter 1: Introduction

# Introduction

This report is not a definitive plan but rather an alternative view of the priorities for planning and management of change in the near future. This report tackles the problem in a simple structure:

- First, we consider the LTRS Options currently proposed and give some opinion on the underlying issues with the plans and the approach to delivery.
- Second, we consider how a future operator – with less cultural and political constraint - might address the issues of:
  - An alternative train plan that allows improvements to the rail service at a realistic pace and affordable cost;
  - Customer service consistent with other successful developed world systems; and
  - An efficient operating structure.
- Third we consider alternative models for the management of rail services based on experience in the UK and Victoria.
- By addressing CityRail's challenges this way we show that there are interim proposals that avoid, for at least a decade, the need to build the CBD Relief Line (CRL) or other large infrastructure, giving ample time to plan the longer term future of rail in Sydney.
- At the same time we present reminders:
  - Of investment choices needing to be made across transport modes to give best value for money;
  - Of the links that should be made explicit between the location of property development (public and private) with the financing of public transport provision to facilitate it; and
  - Of investment options needing to be considered for their contribution to building Greater Sydney's transport network, not just connecting the suburbs to the CBD alone.

# The remit for the review

- Interfleet Transport Advisory has been commissioned by Infrastructure NSW to develop and test a hypothesis that a private franchisee might propose an efficient long term rail strategy. This review has been undertaken in light of strategic option studies by RailCorp and Transport for NSW (TfNSW) as part of their preparation of a Long Term Strategic Plan for Rail which, as part of the TfNSW Transport Master Plan 2031, is due to go to public consultation in 2012.
- The objectives of the report are to:
  1. Produce a network-wide train operating plan for 2031 (peak trains per hour by sector) that:
    - Optimises use of existing assets – meeting capacity requirements whilst avoiding (if at all possible) multi-billion dollar investments in new track capacity
    - Integrates / connects the NWRL in the most effective way, and
    - Improves network-wide customer service outcomes (particularly speed and frequency)
  2. Set out short, medium and long term change agendas, including:
    - Customer-focussed “quick wins”
    - Operating efficiency plans, including revised staffing requirements and savings to taxpayers,
    - Staged transition towards the longer term network operating plan, with approximate timing of service changes and major investments and high-level assessment of implementation risks.
    - Strategy for managing PPP risks – addressing lessons learnt from UK & Victoria experiences
  3. Through the above, enable INSW to play a leading and positive role in the further development of the Long Term Strategic Plan for Rail (via the Transport Master Plan process)

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# Chapter 2: Background - trends, committed schemes & existing strategy options

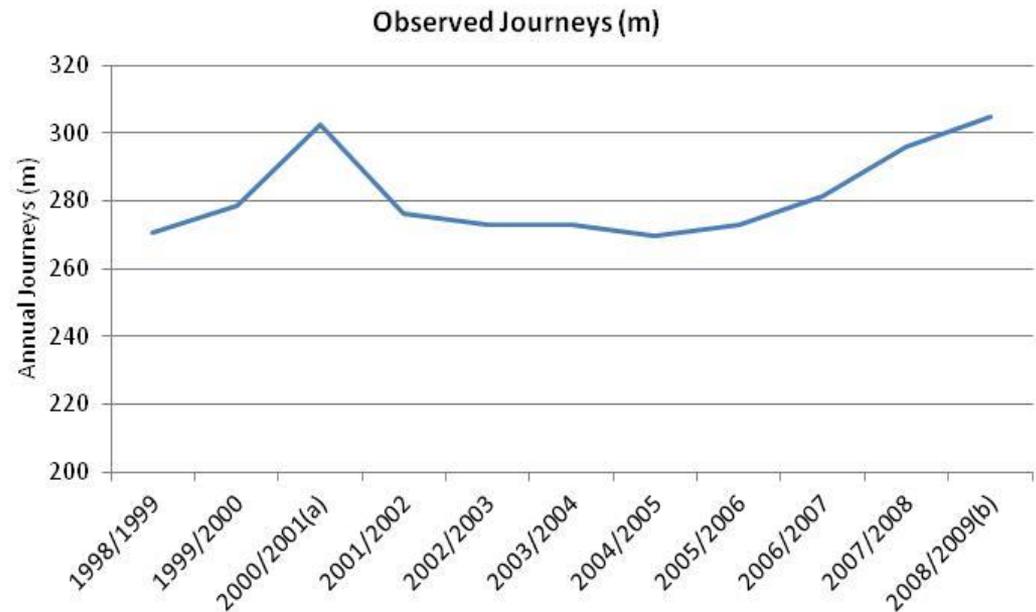
# Headlines

- CityRail carries some 1m passengers on weekdays, with 2/3<sup>rd</sup>s travelling in the AM and PM peaks.
- Over the last decade patronage growth has been slower due to investment in other transport modes (motorways) and the appetite of the railway to attract new customers, but the first effect is passing and demand for rail is growing steadily, putting pressure in particular on services to the CBD. Growth over the next 20-25 years is forecast to be very broadly of the order of 50%.
- Patronage is highest in the peak-of-the-peak (08.00 to 09.00), whereas at shoulder peak times (07.00 to 08.00 and 09.00 to 09.30) demand is less than half that; peak spreading is therefore a key issue as demand rises.
- Examination of the resources employed by the railway over the last five years shows staff numbers and salary costs rising inexorably, with costs per passenger journey also rising, suggesting declining productivity, yet fares have been static (all assessed in constant 2011 values) and cost recovery is poor in comparison with international benchmarks leading to high subsidies.
- Capital investment has also risen dramatically and, if current plans were affordable and were approved, are projected to remain at very high levels annually for the next 10 years and more.
- There is already a very high level of committed or assumed future investment in rail; any further investment needs to be appraised to ensure it represents best use of resources and meshes with environmental and land use policies.

# Observed demand on CityRail, 2010

From the CityRail Compendium for 2010:

- Approx 302 million journeys were undertaken on CityRail in 2010
- On an average weekday 999,000 journeys are undertaken and about 1/3<sup>rd</sup> of these are in the 3.5 hour AM peak period
- Both AM and PM peak periods show balanced demand (325,00 and 330,00 station exits respectively). Together they account for 66% of total daily journeys across the network.



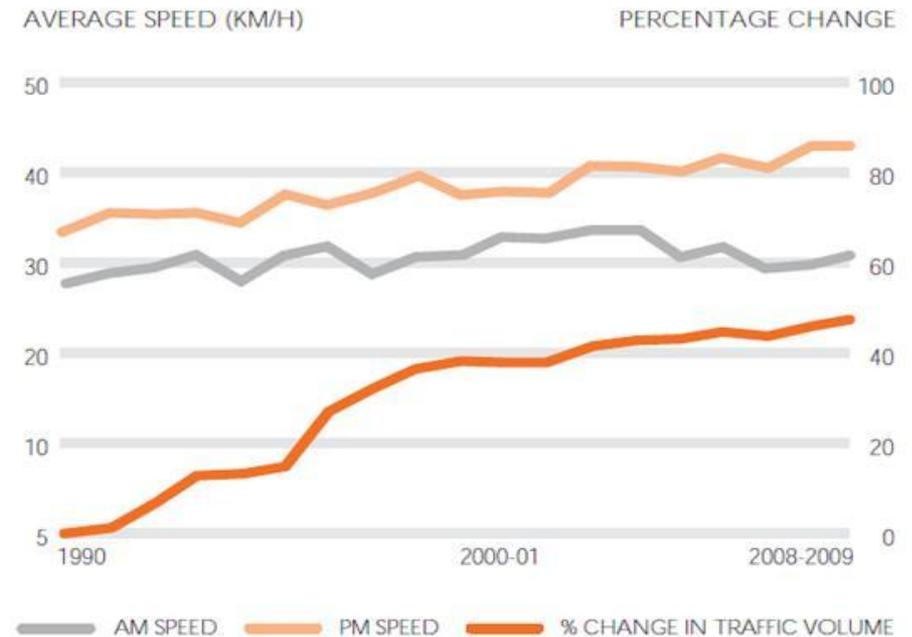
From the chart:

- 2000/2001 peak includes the Olympics & Paralympics related journeys
- From 2001 to 2005 there was a decline in patronage
- From 2006/07 onwards patronage growth has been strong
- Some of these trends are related to interventions on city roads as explained further.

# Impact of road development on CityRail patronage

- The patronage on CityRail has a strong correlation with extensions and improvements on Sydney's road network.
- Sydney's Orbital Motorway Network developed between 1992 and 2001 and the most recent improvements/ extensions took place.
- From 1999-2001 onwards we observe that as road capacity and average AM speeds improved, rail patronage fell as indicated in the chart on the previous page.
- Roads become more congested and AM speeds plummet in 2005/06. Around the same time we see CityRail patronage rising.
- It is clear that in the future, policies for road user charging (tolling/ congestion charge) and parking policies could have a significant impact on CityRail's patronage.

Speed & Traffic Volume Trends on 7 Major routes to/ from Sydney



Source: RTA Annual Report 2009-10

# Hourly demand in AM peak period

Station Exits	2010 (Observed)				2036 (Do-Minimum, AECOM)
	06:00-07:00	07:00-08:00	08:00-09:00 (Peak Hour)	09:00-09:30	08:00-09:00 (Peak Hour)
Wynyard	2,050	9,280	21,030	4,890	30,400
Town Hall	2,550	8,920	20,570	5,910	33,300
Central	2,240	8,200	20,370	6,910	24,200

Source: Demand analysis, Long Term Rail Strategy Ph 5, AECOM, Aug 2011

- There are approx. 100,000 passengers in AM peak hour heading to the CBD
- The top 3 busiest station exits are Wynyard, Town Hall and Central
- The busiest AM hour (08:00- 09:00) accounts for approx 56% of all exits in the AM peak period (3.5 hours)
- From the table, the immediate peak shoulders accommodate about 40 to 44% of peak hour demand, suggesting there is plenty of spare capacity currently and we can expect some spare capacity even in future year 2036.

# Demand by main routes into CBD

## Existing Demand

At present, peak hour demand for CityRail services is not entirely in balance with the frequency provided.

- From the North, 15500 passengers in 18 trains approaching North Sydney;
- From the West, 39700 passengers on 40 trains from the Western lines through Redfern;
- From the South, 6500 passengers on 6 trains from the Bankstown line (Source: CityRail Compendium, 2010).

This demand and frequency mix puts extra pressure on the limited capacity across the CBD and harbour bridge, whereas capacity would be better utilised if more trains were run either round the City Circle (in both directions) or into the Terminal platforms at Central. The City Circle, which is not yet operating at its capacity, provides better CBD dispersal.

## Future Demand

For future year 2036, the AECOM report indicates that peak hour demand in the 'Do-minimum' case will be as follows:

- From the North, 26,037 passengers;
- From the West, 56,564 passengers;
- From the South, 9,588 passengers.

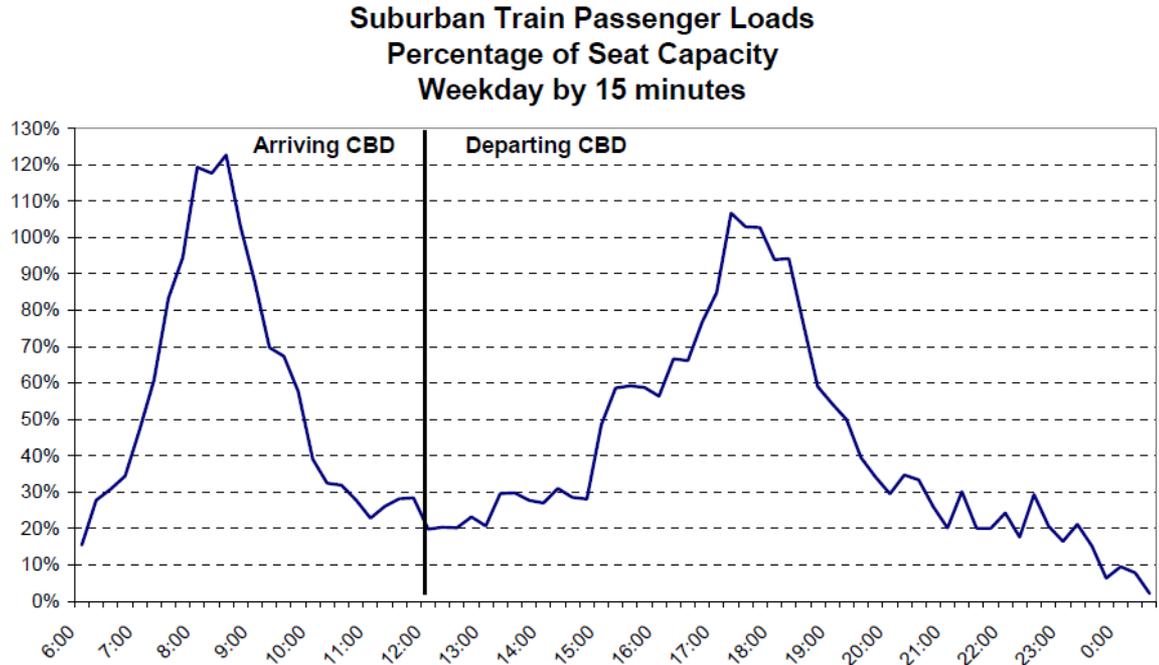
Assuming that each train in 2036 will carry a maximum of 1200 passengers (100% seating + standing capacity) through the peak hour, we obtain the following requirement for trains to meet 2036 forecast demand by direction:

- From the North, 22 trains (up 21%)
- From the West, 47 trains (up 18%)
- From the South, 8 trains (up 33%)

Its worth noting that just signalling improvements could improve existing capacity by 20% (20 tph to 24 tph).

# Arrival and dispersal of passengers in CBD

- The chart further reveals the peaky nature of passenger demand on CityRail to/ from Sydney CBD.
- Currently, the congestion occurs in the AM peak hour 08:00 to 09:00
- Double-decker trains have a total capacity of 1200 passengers (900 seats + 300 standees)
- 120% of Seating capacity for approx half an hour between 8 and 9 AM suggests 1080 passengers per train or 'moderate crowding conditions'.
- It is likely that certain trains in the AM peak hour are more crowded than this, while others less so.



Source: A Compendium of CityRail Travel Statistics, 2010

Demand management and differential fare policy could play a critical role in shifting demand to less busy peak shoulders, hence improving peak hour capacity in the short-term

# Trends in staff growth

## Staff growth

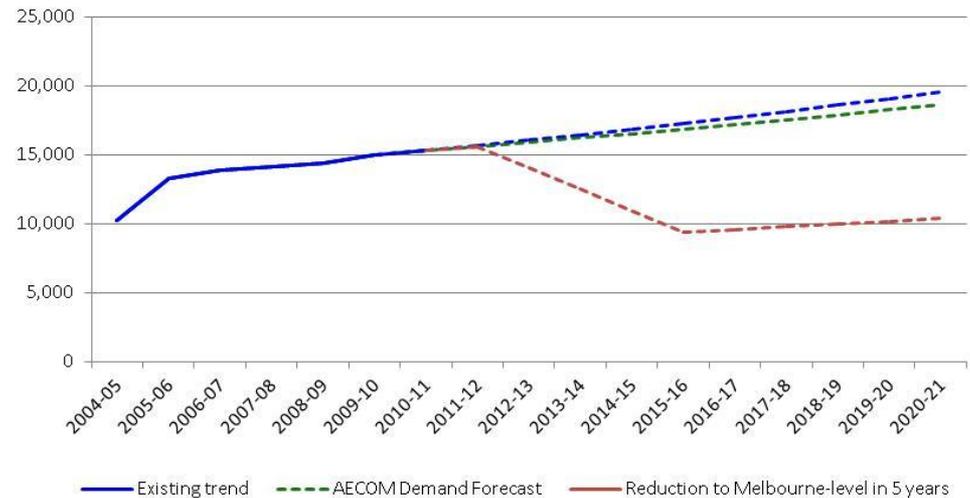
We have analysed RailCorp's Annual reports from 2004/05 to 2010/11 to obtain growth in employees.

Benchmarking indicates that train staff growth is strongly related to patronage growth. For a typical operator, train crew and inspectors may grow just below patronage rates while maintenance and corporate staff grow at much lower rates.

The three scenarios assume:

- Existing Trend: Staff continue to growth at CAGR 2.5% as observed in last 5 years
- Forecast Demand: Staff grow at 2% per annum, the forecast passenger growth rate for 2011-2036 (AECOM, LTRS)
- Optimal Staffing: Assumes that in 5 years staff will reduce to match Melbourne level employees.

High-Level Estimate: Railcorp Staff Growth



It may be noted that Metro Trains Melbourne employed 3700 staff in 2011. Using a pro rata for CityRail based on network length, passengers and stations managed we obtain an optimal staffing of approx. 7500 staff in 2011-12 or 9300 staff by 2015-16.

# Trends in staff salaries & benefits

## Staff salary growth

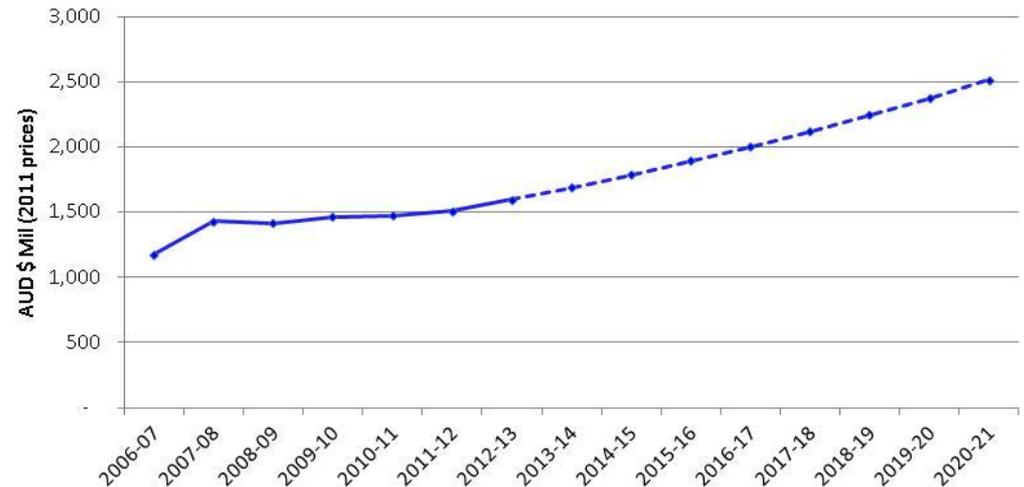
We also analysed RailCorp's Financial Statements from 2004/05 to 2010/11 to obtain the trend in salary and benefits (provisions).

The adjoining chart shows how staff wages and associated costs could grow over the next decade if staff levels and salaries continue to rise as per existing trends.

The CAGR for growth in Salary & Provisions between 2006-07 and 2010-11 is 5.8% p.a.

This outstrips the growth in staff numbers at CAGR 2.5% for last 5 years – productivity increases would be needed to justify this.

High-Level Estimate: Payroll Costs & Employee Benefits



### Notes:

The figures above are from 'Income Statement, Expenses- Payroll costs and other employee benefits' from RailCorp Annual Reports. These have been converted to 2011 prices to facilitate comparison.

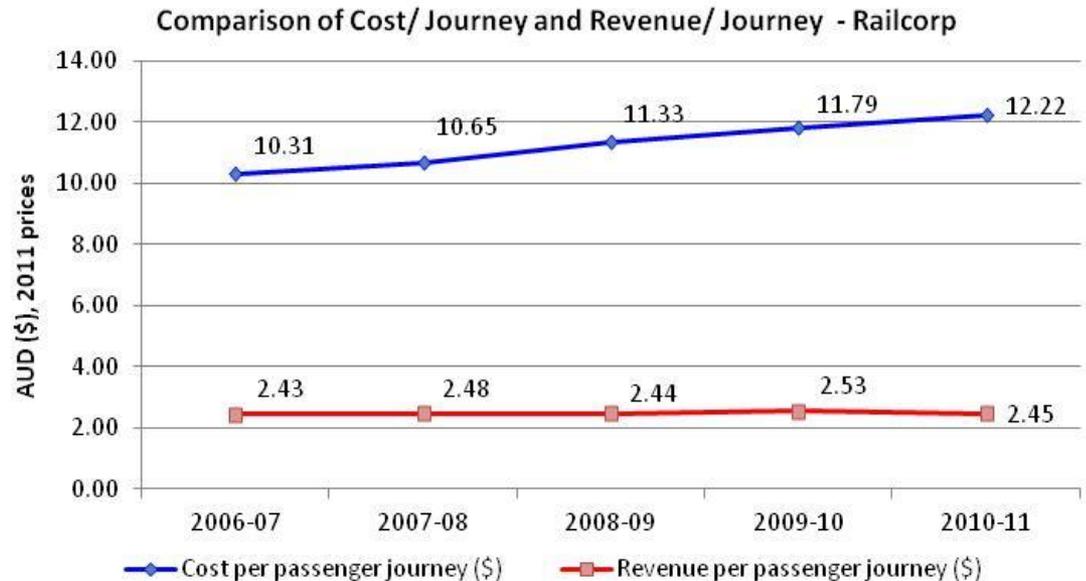
# Trends in operating cost & revenue

## Operating Cost/ Passenger Journey

Based on data obtained from the Annual reports, we have been able to plot the trend for costs/ journey for RailCorp converted to 2011 prices.

Costs/ journey (including fixed and variable costs) have continued to rise steadily over the last 5 years suggesting that productivity has not improved, but declined.

The revenue per journey however remained more or less the same during this period, showing a decline in the cost recovery from passengers over the 5 years reviewed from 23.6% in 2006/07 to 20.0% in 2010/11.



### Notes:

The cost, revenue and journeys data used in the calculation above include both CityRail and CountryLink journeys.

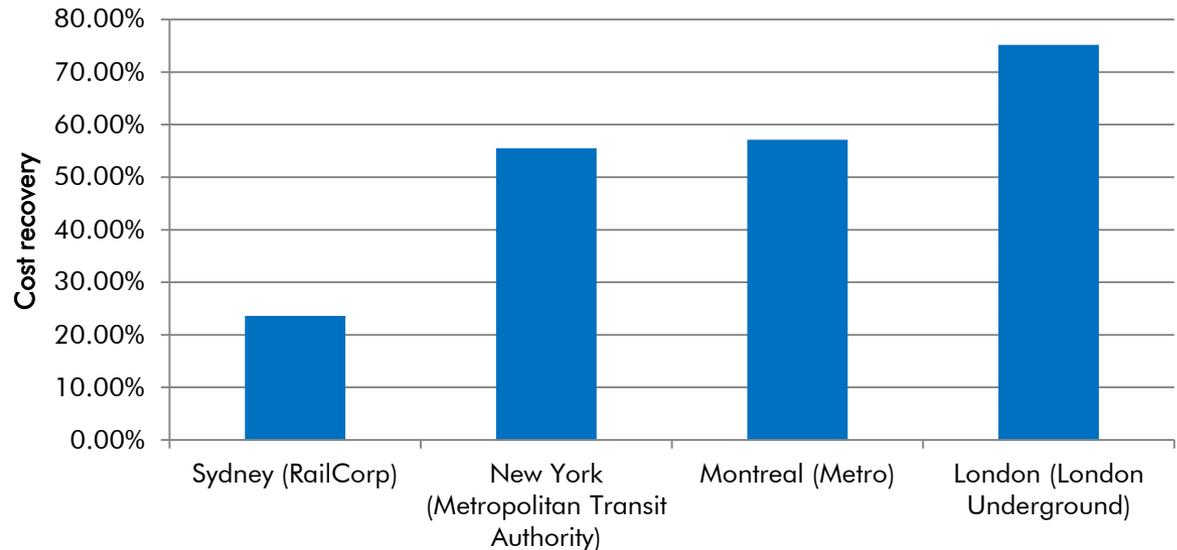
Costs are measured as operating expenses (including depreciation).

# Benchmarking - Cost recovery

From our benchmarking analysis of the percentage of operating expenses recovered from users in fares:

- RailCorp recovers less than 25% of its costs from users – requiring over 75% as subsidy by the taxpayer.
- This is less than half that of major comparators such as New York MTA and Montreal Metro.
- It is only a third of that achieved by London Underground.

Benchmarking of cost recovery for rail and metro systems



Operating subsidy is some \$1.7 billion/annum; reducing that will depend as much (or more) on achieving savings in variable costs as it will on increasing revenues.

Sources:

RailCorp (2010), 2009-10 Annual Report;  
Transport for London (2010), Annual Report and Accounts, p.122;  
Societe de Transport de Montreal, Annual Report (2006-7 figure)  
Metropolitan Transport Authority, 2009-10 Annual Report.

# Trends in government subsidy

## Subsidy

Based on RailCorp's Annual Reports, values are shown for government subsidy over the last 6 years.

The overall amount of subsidy has remained more or less constant during this time although figures vary from +/- AUD\$100,000 each year. This does not appear to reflect the widening gap between costs and revenues (which may be masked by accounting changes or balance sheet management), raising questions regarding financial sustainability.

The subsidy per passenger has also remained consistent with 2006-07 being the year with highest subsidy.

However the value of subsidy itself at AUD\$5.71 in 2010-11 is significantly high compared to other train systems as explained in later slides.

Year	Subsidy (AUD \$m, 2011 prices)	Subsidy per passenger journey (AUD\$, 2011 prices)
2005-06	1,578	5.98
2006-07	1,715	6.34
2007-08	1,692	5.94
2008-09	1,589	5.41
2009-10	1,708	5.87
2010-11	1,693	5.71

### Benchmark comparison:

Subsidy per passenger journey on the UK's South West Trains franchise including the infrastructure subsidy to Network Rail is some \$0.62 in 2010/11.

# Trends in Capital Investment

## Capital Investment

The adjoining chart shows the observed and estimated capital investment trend for Sydney's suburban rail.

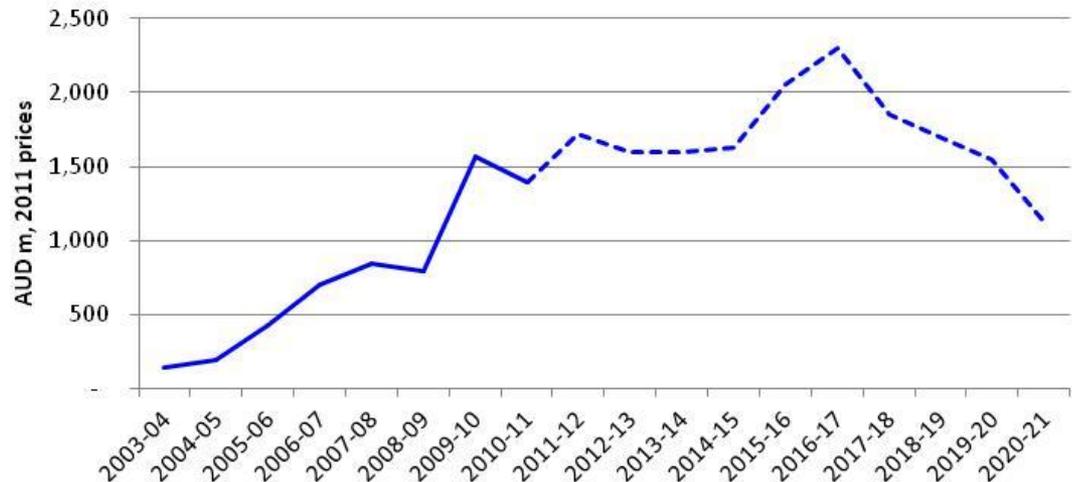
The observed investment from 2003-04 to 2010-11 has been obtained from RailCorp's annual reports.

The 2011-12 value has been obtained from NSW Infrastructure Budget paper.

The values from 2012-13 & 2013-14 are based on likely investment figures mentioned in the Budget paper.

All other future year estimates are based on Halcrow's Cost Report, Aug.'11.

Growth in Capital Investments in Railcorp- Observed & Halcrow Estimates for 3-Tier Scenario



Already at a historic high of \$1.5 billion/ annum, the more economic options derived from the LTRS studies would require maintaining investment at this level or higher over a further 10 years.

# Committed or proposed rail schemes, Base Case

The Long Term Rail Strategy Ph 5 assumes that the following investments will be undertaken by 2036 in the Base Case or 'Do-Minimum'

## Greenfield projects

- South West Rail Link (SWRL), \$ 982m – *under construction*
- North West Rail Link (NWRL) Ph 1, \$ 6,631m - *proposed, alignment to be confirmed*
- Paramatta Epping Rail Link (PERL), \$2,632m – *this has now been deferred – for the present*

## System wide works

- Signalling, Base case ERTMS L1 & L2, \$ 251m
- Base Traction Supply upgrades, \$167m

## Rolling Stock

- Double deck suburban, \$4,263m
- Double deck inter-city, \$713m

Committed Investments	Base Case (\$m)
Infrastructure works sub-total	10,245
System wide works sub-total	428
Rolling stock sub-total	5,261
Total	15,934

- The Base Case also includes implementation of 'Clearways timetable'.
- Not all the investments mentioned have obtained committed funding, but relate to RailCorp's expectation.
- Even so, the scale of investment that is either committed or likely to be committed for capital works till 2036 in the Base case or 'Do-Minimum' scenario is substantial.

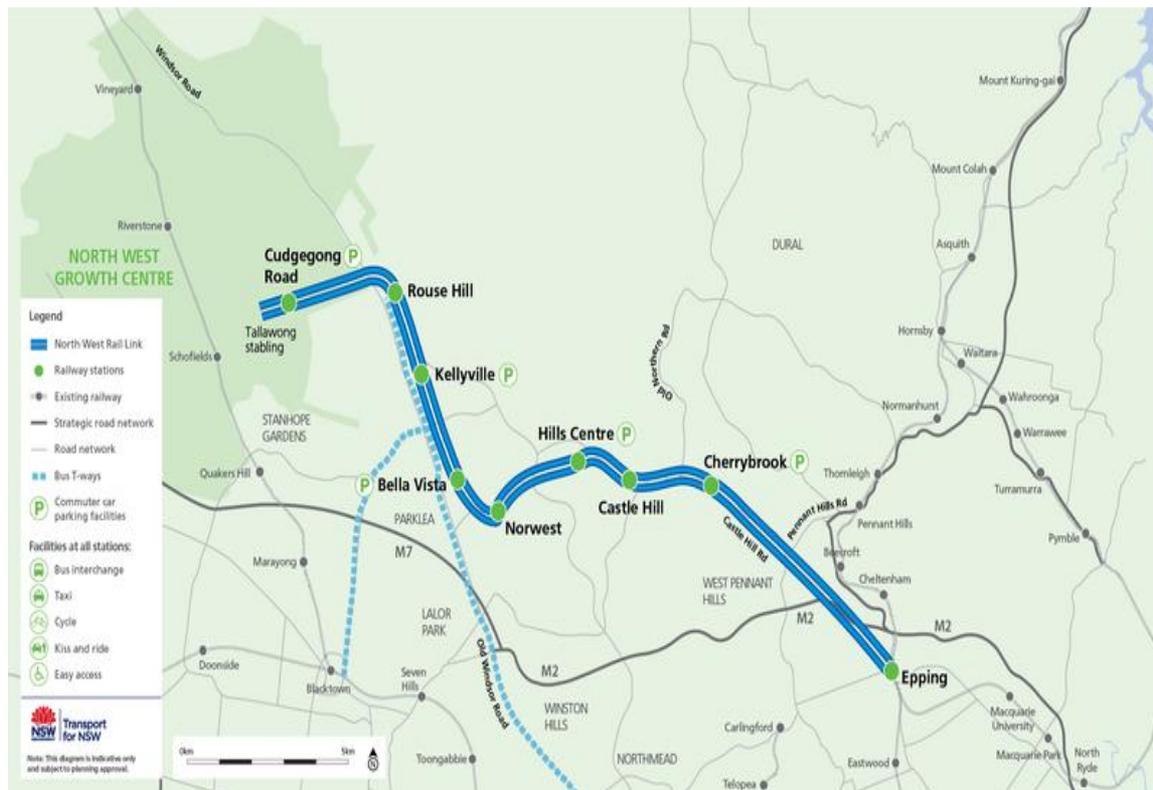
# Other schemes for rail in Sydney

Other schemes that have been studied but are currently not being pursued include:

- **Western Fast Rail:** An express 10 minute CBD to Parramatta service, with possibly zero or one stop, with trains continuing west on existing tracks. This would replace the existing express services to Penrith
- **Fast West metro:** This study proposed the construction of an underground tunnel for express trains with about 6 new stations between CBD and Parramatta, using "metro style" rolling stock to achieve a travel time of 20 mins. Services would continue west as an all-stops metro to Penrith and Richmond.
- **West metro:** The plan proposed about 10-12 stations between the CBD and Parramatta, where it would terminate. Trains would not continue west on existing track.

# North West Rail Link

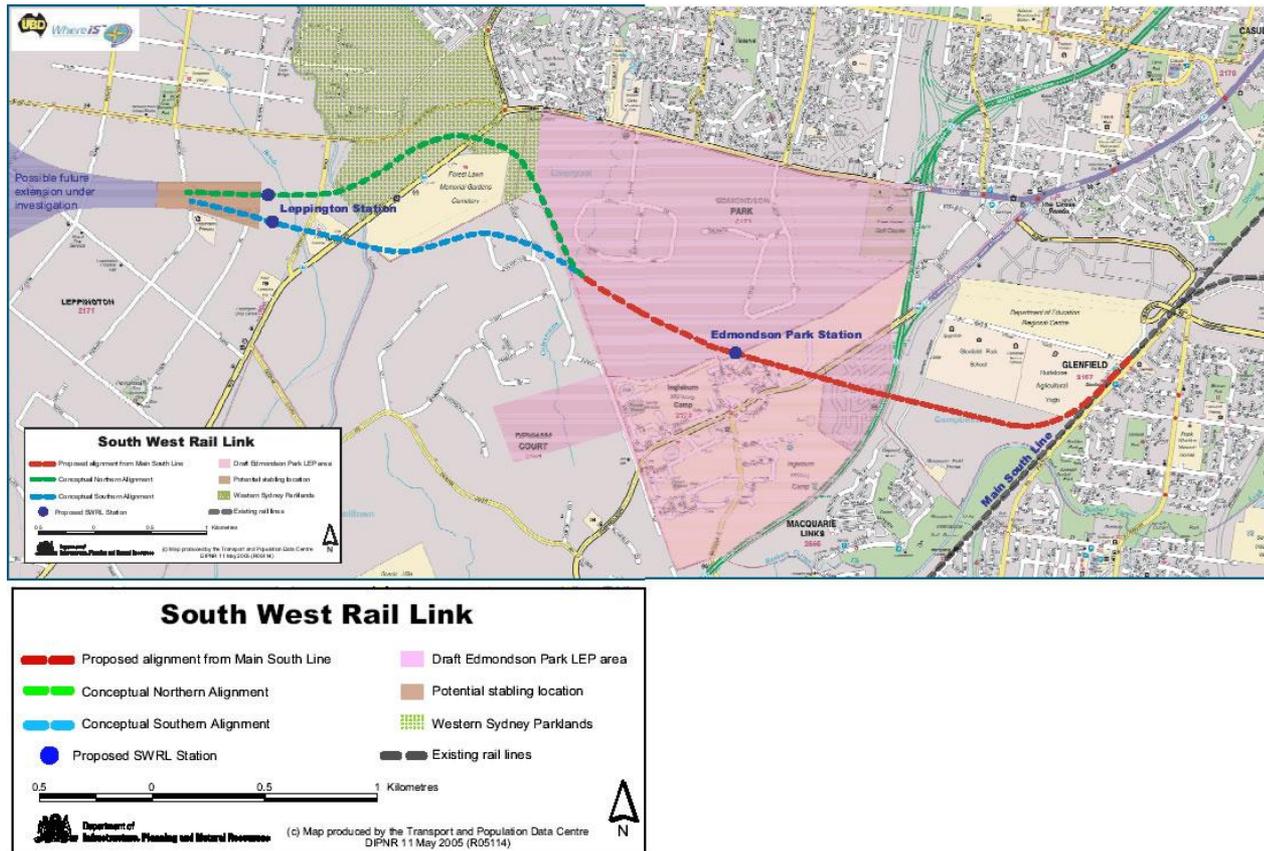
The map below shows the proposed alignment for NWRL



- The NWRL will connect the new growth areas in north west Sydney via Epping.
- Increased demand from the north-west to the CBD is likely to add to crowding on the CBD routes in the peak hour.
- Routing of services via Strathfield may help to avoid pinch-points at the existing harbour crossing near North Sydney.

# South West Rail Link

The map below shows the proposed alignment for SWRL



- Offers improved connectivity to areas west of Leppington.
- Likely to generate more local passenger trips.
- Limited impact on rail operations into CBD area, although a small increase in number of passengers going to CBD in the AM peak is likely.

# Key features of Base Case - 'Do-Minimum'

Assumptions for the Base Case are:

## Clearways

- Kingsgrove to Revesby quadruplication
- Quakers Hill to Schofields duplication
- Liverpool turnback

## New Rail Lines

- South West Rail Line (expected completion 2016)
- North West Rail Line (expected completion 2019)
- Paramatta Epping Line shuttle – *deferred for the present*

## Freight Rail

- South Sydney freight Line
- Northern Sydney freight Corridor

## Stations

- Easy Access Compliance
- Fire & Life safety upgrades- Wynyard and Town Hall

## Rolling Stock and Enablers

- Rolling stock to support committed projects plus growth trains to take up available spaces (~44 trains till 2036)
- Stabling and maintenance to support the extra 44 trains as well as associated OHS and minor works for yards
- Replacement of existing rolling stock between 35-40 years old with comparable performance rolling stock

## Systems

- Currently committed traction supply upgrade program
- Automatic Train protection, Control Automation project
- Digital train radio System
- Safety & security minor works

## MPM capital

- Major periodic capital investment ~ \$160 to \$200m p.a.

# Investment options-Long Term Rail Strategy (LTRS) phase 5

Construction Capital Costs (\$m)	Base Case	MREP	West Link	Sector 5	3-Tier	Modified 3-Tier	West Link 3-tier	Harbour Link 3-tier
Infrastructure works sub-total	10,245	22,435	22,258	25,555	16,440	16,945	22,621	25,061
System wide works sub-total	428	1,370	2,095	3,392	2,885	2,843	2,774	2,774
Rolling stock sub-total	5,261	6,912	6,531	8,838	7,786	7,381	7,596	7,588
Total	15,934	30,717	30,884	37,785	27,111	27,169	32,991	35,431

Source: Capital Cost Estimates, Halcrow, Long Term Rail Strategy Ph 5

Note: All costs in Mar 2011 prices

It can be seen that the 3-Tier and Modified 3-Tier options have the lowest incremental costs for infrastructure works of \$6.2bn and \$6.7bn, largely being for the \$5.6bn CBD extension ('Relief line')

# Key features of the seven LTRS options

No..	Option	Operations	Rolling Stock	Infrastructure
1	Suburban Metropolitan Rail Expansion Plan (MREP)	Operational separation (sectorisation) of services to improve performance and reliability	Similar suburban double deck rolling stock	Single stage construction of CBD Ext. & 2 <sup>nd</sup> harbour crossing
2	Suburban- West Link	Express western services through Wynyard	Same as in 1	Initial construction of CBD Ext. To enable faster western services, later construction of 2 <sup>nd</sup> harbour crossing
3	Suburban- Sector 5	Mix of fast, slow, skipped services to minimise travel times (at the expense of frequency)	Same as in 1	Same as in 2
4	Customised 3 Tier services	Three distinct services for short, medium and long distance trips	Single-deck for short haul, double-deck for longer haul suburban/ inter-urban trips	Construction of CBD extension
5	Modified 3 Tier	As in 4 but NWRL serviced with suburban rather than Metro style services	Same as in 4	Construction of CBD extension
6	Harbour Link 3 Tier	As in 5 but higher frequency services from the north	Same as in 4	Construction of CBD extension And 2 <sup>nd</sup> harbour crossing
7	West Link 3 Tier	Converts some corridors to allow for high frequency services on inner lines	Same as in 4	Same as 6

Source: Transport for NSW publication, Nov 2011

# Project appraisal- LTRS phase 5 options

- Economic Appraisal of infrastructure projects is a vital tool used by planners and governments worldwide to determine if investment is likely to yield adequate returns given budget constraints.
- It is particularly useful for large capital cost projects such as transport infrastructure where a number of alternatives between modes and specific development options for a selected mode need to be tested and ranked for funding, in line with overall policy objectives.
- It is usual for investment decisions to be based on the outcome of an economic appraisal that maximises the benefit between projects and for various permutations of the same project.

The key findings of the strategic economic appraisal for all the LTRS Options was undertaken are as follows:

Option	BCR	IRR
MREP	0.6	4.1%
Suburban- West Link	0.9	6.1%
Suburban- Sector 5	0.4	2.4%
Customised 3 Tier services	1.0	7.1%
Modified 3 Tier	0.6	4.5%
Harbour Link 3 Tier	1.0	7.0%
West Link 3 Tier	0.8	5.4%

Source: Strategic Economic Appraisal, LTRS Ph 5, PwC, Aug'11

It is notable that all LTRS options other than the Base Case include the \$5.6 billion CBD Relief Line. None of the options offers a BCR greater than 1, which is the usual criterion for project selection.

# Project appraisal - high level review of methodology

A high-level review of Strategic Economic Appraisal for LTRS options raised the following issues:

- The choice of schemes included in the Do-Minimum Base Case scenario makes a very significant difference to appraisal results.
  - It appears that Halcrow have added 40% contingency but Quantitative Risk Analysis (QRA) has not been undertaken - leaving questions regarding outturn cost certainty.
  - The residual values for infrastructure may have been under-estimated. For tunnels/bridges these would extend beyond the 30-year appraisal period.
  - The Values of Time (VoT) are potentially over-estimated as only commuter and business VoTs are used, although this is in line with ATC guidelines. Growth in VoT is assumed to be 1% p.a. Although ATC recommends using 0.5% p.a.
- We consider the use of a 'reduced reliability' Base Case highly misleading, ignoring lower cost operational improvement options and thus incorrectly enhancing the LTRS options.
  - Our initial review suggests that there may have been over-estimation of benefits:
    - Additional car feeder trips to the station, park & ride trips, drop-off trips would reduce congestion benefits
    - The assumptions behind proposed mode shift to rail are not detailed. Based on experience in other cities, time-saving of 1.7 to 3.7 minutes appears too low to cause significant shift from private modes, unless accompanied by policy restrictions on car use.
    - The appraisal does not consider lowering demand on bus operations that could lead to a need for additional subsidy in some cases.
  - Externality values are applied in a simplified way. For example impact on 'water' and 'nature' has not been quantified for a new harbour crossing or tunnel.

# Project appraisal policy conclusions

Policy issues emerge from the appraisal:

- None of the options demonstrate a clear economic case for funding. Two options just 'break even' on costs and benefits.
- The sensitivity test, especially in respect of cost overruns/ optimism bias leads to the conclusion that the central case may not be robustly defined.
- We would have expected to see some tests with less capital-intensive options.
- There is a growing case for considering wider economic benefits of transport projects. This is not included in BCRs and could lead to an uplift of 10 to 30%.
- It is to be noted, the PwC report clarifies that this appraisal only considers the relative merits of the options described. More comprehensive economic and financial appraisal is recommended before an investment decision is taken.

- In our view, when the scale of potential investment is as large as that described in these studies, decisions must be based first on a strategic appraisal that includes other transport interventions at the city, regional and even national level that may be vying for funding.
- A 'Stage 1 Appraisal' or a 'scarce resource investment decision' would:
  - Be led by strong, clear policy decisions guiding the short, medium and long term transport policy for Sydney;
  - Be closely associated with the Master Plan and proposed Land Use developments for the city;
  - Allow for investment choices between a range of public transport interventions, freight improvements and road improvements.
- A 'Stage 2 Appraisal' would test the 'alternative development scenarios' for a specific intervention that maximises benefits for the population.

A secure policy approach is essential if sound investment decisions are to be taken.

# Alternative options to be appraised

- The validity of the 'reduced reliability' Base Case should be reviewed in the light of our proposals for a potential alternative train service for 2031, set out in Chapter 3b. It could be retained as a sensitivity test.
- In Chapter 3b we set out eight incremental building blocks for the potential 2031 train, some of which require capital investment. These should be refined and then appraised both as individual increments and collectively against the Base Case and the reduced reliability sensitivity case.
- Once the overall result of that appraisal process is available, such that an optimised 2031 Base Case can be established to replace the 'reduced reliability' case, then the CBD Relief Line could be appraised against the optimised Base Case.
- Indeed, if any of the more promising LTRS or similar options are still felt to be appropriate, they could also be appraised against the optimised Base Case.
- It is noted that the 3-Tier and Modified 3-Tier options both combine two elements: revised operating plans and the construction of the CBD Relief Line. Those elements could be evaluated separately.

An appraisal process should be planned to enable sound decisions to be taken regarding the future investment needs of the railway.

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# Chapter 3a: Towards an alternative train operating plan

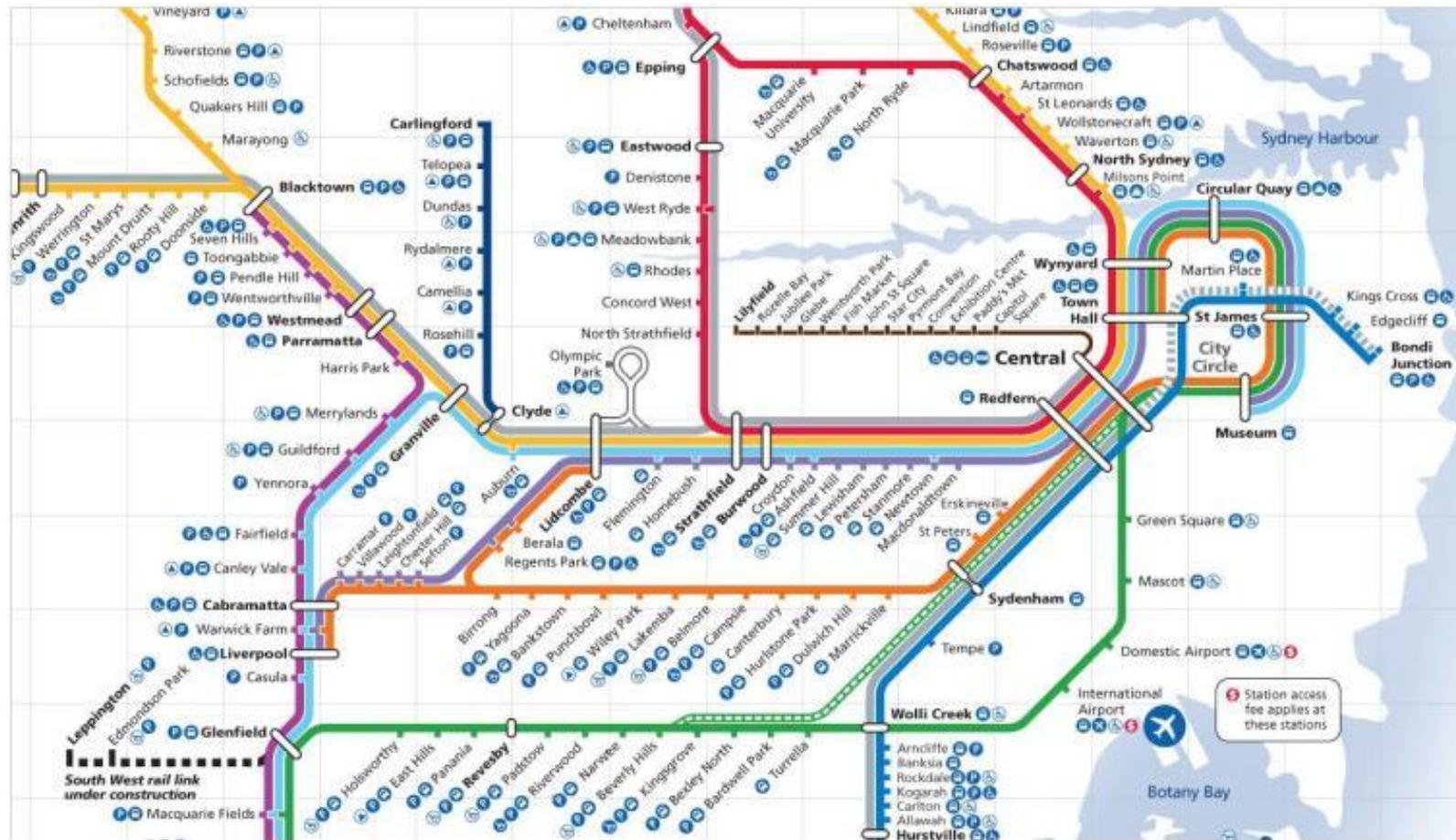
# Headlines

- Demand pressures in the Sydney CBD are represented as resulting from a lack of capacity on existing lines rather than the lack of a network and the impetus has been to reinforce existing patterns, but there would be powerful reasons to test long term strategy for its contribution to diversifying the network.
- RailCorp's clearways plan provides a useful basis for further developing operational robustness, but we observe that changes in trackwork layouts need to be designed to meet passenger demand across the network. We see good reasons to integrate North West Rail Link services via Strathfield.
- Single-deck trains combined with improvements at CBD stations would increase capacity on Inner West/Bankstown/East Hills services and on the Sydney to Epping/Hornsby routes.
- Simpler service patterns would have an appreciable effect on passenger concentrations on platforms in the CBD (e.g. boarding in the evening peak).
- Upgrading signalling could increase capacity by some 20%-50% depending on technology used.
- Taken together, these changes (subject to their being developed and appraised as an option in the business case) could allow other major investments to be deferred substantially.

# Network structure and capability

- Sydney's rail system has developed as a single entity, without the tiered network of infrastructure of many world cities.
  - It lacks a second level of rail network - the equivalent of the New York Subway, the Paris RER and Metro, or the London Underground;
  - It fails to provide interchange possibilities that give a network flexibility and convenience for passengers and operational robustness.
- Sydney relies all the more on CityRail's radial system of lines which represent the only off-street public transport alternative to the car.
- The problem of demand in the Sydney CBD has been seen as a lack of capacity on existing lines rather than a lack of a network, and so efforts have concentrated on reinforcing existing patterns.
- Without a diversified network to distribute 'locational advantage', the concentration of land use pressures and passenger demand in the CBD are inevitable.
- Hence, there are strong reasons to test any long term transport strategy for its contribution to diversifying the network – whether or not credence is given to the 'City of Cities' concept, the broadening of the CBD itself increasingly demands network diversification.
- Indeed, CityRail need not be the only answer to this conundrum.
- Yet, while it is the only show in town there is much can be done to expand its capability without major new build projects beyond those already committed.

# CityRail Sydney - map of central zones



# Observations and opportunities

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- The impact of the Waterfall accident/inquiry and the introduction of data-loggers has resulted in longer journey times. It is observed that this results from RailCorp's applying a conservative approach to safety – but also to drivers being ultra cautious so as to not get 'pinged' by the data-logger.
- It is observed that routing Northern Line Hornsby services through the new Epping Chatswood Rail Link has changed passenger loadings at Wynyard and Town Hall.
- Significant interchange also takes place at Town Hall – to/from Illawarra.
- The capacity available at Museum and St James' stations, if passengers could be encouraged to use it, would reduce the load on Town Hall and Wynyard stations.

# Short and medium term changes to the operating plan

- Railway networks evolve, usually somewhat accidentally through the occasional coincidence of customer demand, political will and availability of funds.
- Networks have associated with them a range of operating practices, which may have been appropriate when first devised but may be open to challenge now.
- It is unwise to continue with the evolutionary development of a railway network without occasionally pausing for reflection; this is particularly the case when significant expenditure is proposed.
- In a strategic planning exercise such as this, it is worth examining a range of the elements of the existing CityRail network, which are presented in the following pages.

# Track and other elements

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- Even if the major elements of a rail network appear to be structurally-sound, the way in which they are linked together may not be.
- Elements which need to be considered include track layouts at junctions and termini, and the choice of linkages between one train service and another.
- We first consider RailCorp's recent Rail Clearways Plan, and then discuss a range of network elements after that

# Rail clearways plan

- Some network thinking has recently been undertaken by RailCorp through the Rail Clearways Plan.
- This contains a range of solid performance-enhancing measures, although the business cases for all of them is unclear, since the train service frequencies at some of the locations are not high.
- The creation of extra capacity implies an ongoing maintenance and renewal liability, which could worsen cost recovery in the future.
- Moreover, this plan is perhaps unduly operationally-focussed: a balance needs to be struck between operational planning and demand planning:
  - Separation of services on the East Hills line should give significant time savings to passengers from the more distant part of the CityRail network around Campbelltown;
  - On the other hand, terminating Bankstown line trains in a bay platform at Lidcombe necessitates an interchange for passengers wanting to make journeys *between* the suburbs; inserting recovery time at stations on a section of line with spare capacity (e.g. Regent's Park) might provide an operationally-robust solution with higher demand.

# Track layouts: West

- Between Redfern and Strathfield, the main Western corridor is a 6-track railway comprising main, suburban and local lines.
- However, the stopping pattern of train services does not fit well with the platforms provided on the different tracks.
- This means that track capacity is unevenly (and hence perhaps not optimally) used:
  - InterCity and CountryLink trains use the main lines;
  - North Shore & Western line services use the suburban lines;
  - Inner West, and Southern line services use the local lines.
- The disadvantage with the last of these is that Inner West services call at all stations, but Southern line services (despite using the same tracks) do not. Southern line services call at Newtown, which may prevent them unnecessarily catching up preceding Inner West services, but it is not clear what the demand rationale is for this.
- The real problem may be with the location of crossovers:
  - A full set of crossovers in each direction just before Ashfield allows Southern line services to run on the suburban lines and to cross over onto the local lines just in time to conflict with all-stations trains which terminate there; provision of a crossover *after* the station might enable those conflicts to be eliminated, although following Westbound trains on the suburban lines might be impeded;
  - Consideration of the optimal positioning of crossovers across the network is recommended.

# Track layouts: South West

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- In order to minimise potential train movement conflicts, good practice for terminating trains on a through line is to do so in a centre reversing siding.
- It is not clear if this is done at Liverpool or Campbelltown, whilst at Glenfield and Macarthur the current track layout prevents this.
- The exact operation of Glenfield after completion of the South West Rail Link is unclear, but ideally needs to enable cross-platform interchange in the same direction whilst keeping trains running in parallel without conflict.
- In the medium-term, track layouts in this area need to be rearranged in order to improve the punctuality of all services.

# Track layouts: Central

- The current linkages of services between the North Shore and City Circle lines are not the only permutations possible:
  - On the through lines between Central and Redfern, Southbound/down tracks are generally at or below ground level, with Northbound/up tracks elevated;
  - Suburban tracks from the West are linked directly into the North Shore lines, with the local tracks from the West leading into the City Circle lines via Wynyard;
  - The City Circle tracks via Museum are connected into the Bankstown and Airport lines.
- The current track plan allows for all these movements, whilst also providing some cross-platform interchange possibilities at Central for services on the two corridors via Wynyard.
- Whilst in theory all these connections could be made differently, it might be difficult to avoid conflicting movements, and the effort/disruption in achieving a different pattern does not immediately appear to be worthwhile.
- Increasing line speeds between Redfern and the terminal platforms at Central would make a noticeable difference to passengers.
- It would also reduce round-trip times and help improve overall system efficiency for both rolling stock and train crew (see Chapter 6 below).

# Integrating the North West Rail Link

- After some political debate, it is understood that the NWRL is to be built from Epping. We also understand there is a commitment for services to link to the Sydney CBD direct.
- Epping is a bi-level station, with the lines from Chatswood underground. Connecting the NWRL to the Chatswood line would provide direct services to the North Sydney area, which is a potentially attractive destination in itself, and then on to the CBD over the harbour bridge.
- However, it would further focus train services on that part of the network which is already most congested, also a consequence of the rail clearways plan. Whilst providing an opportunity for passengers to change at Epping, it would be more helpful for the network as a whole if some (say half) of the NWRL train services fed into the Strathfield lines – and that is our suggested solution.
- This is subject to full appraisal of the options as part of the business case for the project in due course - once infrastructure costs, operational priorities and constraints have been fully explored.
- Providing services on both routes extends a much wider range of journey opportunities, diversifying the network, and helps to reduce the CBD's dominance. Journey times to Central are faster via Strathfield (c. 35 mins v c. 45 via Chatswood) and similar to Town Hall/Wynyard via either route.
- If there were no commitment to link direct to the CBD an alternative could be shuttle services linking at Chatswood (and ideally at Strathfield), preferably with convenient, cross-platform, interchange - as long as the latter can be provided without loss of line capacity at those locations.

# Single- or double-deck trains? (1)

- RailCorp has traditionally used double-deck trains for all CityRail services, but the relative advantages and disadvantages have been assessed as part of the Three Tier proposal and need to be considered.
- Double-deck trains gain seating capacity, which is particularly important if passengers have longer journeys (> 20-30 minutes).
- But total capacity may not be much affected, since the seats themselves take up space: within the dimensions of RailCorp vehicles, both fully-seated double-deck and less-seated single-deck vehicles can accommodate about 200 passengers.
- Stock with much seating also tends to make movement along the train more difficult (especially when there are stairs) which increases crowding as spreading demand evenly between vehicles is more difficult.
- Double-deck trains lead to a loss of line capacity from longer station stops, which is particularly important in CBD-type environments. But how much capacity is lost?

## Single- or double-deck trains? (2)

- Although double-deck trains are normally designed with particularly-wide doors, these do not make up for the slower passenger movement caused by stairs immediately inside the train.
- Note that single-deck trains can also have these equally-wide doors, if so designed. Per metre of door width, the boarding/alighting rates of double-deck trains may only be  $2/3$  those of single-deck trains.
- If peak passenger movements at the three CBD stations were 40 passengers per door per train, single-deck trains might achieve  $40 \times 3/2 = 60$  passenger movements in the same time. OR might save  $1/3$  of the time otherwise spent in alighting and boarding, which tends to be 30-40s. Saving 10s per train stop on a 20tph service generates another 3 minutes, in which one can run another train.
- In addition to saving time in platforms, modern single deck trains are lighter and more accelerative than current double deck trains, while also have excellent crashworthiness. As such it can be expected that they would reduce journey times and could make the service more attractive, despite the reduction in seating capacity.

# Single- or double-deck trains? (3)

- CityRail has traditionally inter-worked services between lines, so that all lines had to have broadly-similar rolling stock.
- But what if lines were not inter-worked?
- This would allow the differentiation of rolling stock between inner- and outer-suburban services.
- It would enable Inner West/Bankstown/East Hills line trains to be formed of rolling stock designed for high-density inner-area services (e.g. the ex-KCRC lines in Hong Kong, or LOROL in London).
- More importantly (given the exact location of capacity constraints such as the Harbour bridge) Northern line services between Sydney and Epping/Hornsby (via either route) could also have such stock.
- Journeys are relatively short AND there is some passenger turnover at Chatswood and Strathfield, so that few (if any) passengers would have to stand for more than 20-30 minutes.



# Station stop times (1)

- RailCorp has already made significant progress in reducing dwell times on the North Shore corridor.
- Further benefits arise from fewer signal checks just outside stations, and an overall easier flow of trains through the system.
- Nevertheless, station stops of over one minute are common, especially at Town Hall.
- Platforms at Town Hall are of an island design unhelpfully dissected by buildings and staircases.
- Furthermore, while there are multiple platform access/egress points which should help to spread demand, the platform ends are relatively underutilised and consideration could be given to the location of stairways in order to make better use of the whole platform lengths.
- At Wynyard and Town Hall the platforms and train vestibules have about a 300mm height difference (big step up to the train). These also have had additional services and signage added on an ad hoc basis (e.g. fire services) that could be relocated to improve platform capacity and passenger flow.
- Resolving these issues should be seen as a priority.
- Consideration should be given to the holding of passengers at higher levels until their train is due; although physically difficult because of site limitations, even a programme of publicity and announcements might keep 100 passengers off the key platform.
- Unfortunately, platform crowding is added to because the number of different service patterns means that many passengers cannot get the first train. This is reviewed overleaf.

## Station stop times (2)

- As Town Hall station is effectively the constraint, not the train service, the latter should be redesigned to fit the former. Simplifying the service could unlock platform capacity at Town Hall.
- A cursory analysis of evening peak (1700-1800) departures from Town Hall shows six different destinations:

In the Southbound direction:

- Blacktown
- Epping
- Penrith
- Schofields
- Emu Plains
- Richmond

...and in the Northbound direction:

- Hornsby via Macquarie Park
- North Sydney
- Gosford
- Wyong
- Hornsby via Gordon
- Berowra

- It is not possible to be definitive without knowing the exact numbers of passengers to each destination, but we would expect passengers for the less-frequent services to turn up longer in advance of their trains.
- While this may seem a marginal issue, a simpler service pattern at Wynyard and Town Hall, especially combined with bigger, easier to read on-platform indicators, would help to reduce the numbers on platforms, save passenger confusion, smooth out flows and thus minimise platform congestion.

# Splitting and joining

- Some railways which have capacity problems in a core area but passengers from a wide variety of origins split and join trains.
- In historic times, this was a manual process using externally-mounted equipment, with considerable opportunities for problems to arise. With more modern rolling stock, automatic coupling/uncoupling has become much easier:
- Railways such as Southern, in the UK, undertake a considerable programme of coupling/uncoupling (e.g. half-hourly at both Horsham and Haywards Heath) without a huge effect on performance.
- If it was desired to simplify train service patterns on the Western/North Shore lines in the CityRail area, it might be possible to use this approach, although:
  - RailCorp's Tangara stock – cannot be reliably divided and amalgamated;
  - DDIU coupling is not fully automatic (have jumper cables);
  - Waratah stock is permanently coupled as 8-car trains.
- Moreover, the obvious place to try this (Blacktown, separating Penrith & Richmond portions) has a track layout which is quite unsuitable, as platforms for the two branch lines are separate.
- Depending on the rolling stock, it might be possible to use this approach to provide a simpler higher-frequency service to more distant stations on the North Shore line (e.g. Wyong) by having portions removed/added at Hornsby, which has plentiful facilities (e.g. reversing sidings).
- This would also lead to a reduction in train capacity in the more distant suburbs, where it is not needed (e.g. 8-car trains in the contra-peak direction will be relatively empty).

# Train lengthening

- Railway line capacity is affected by train length but signalling-determined inter-train spacing is usually more important for passenger trains.
- Lengthening trains could therefore, in theory, be a useful way of adding capacity, although:
  - Ensuring an even spread of passengers along long trains is difficult;
  - CityRail's 8-car trains are quite long already.
- Platforms at all quieter stations may not need to be lengthened, because selective door opening arrangements can often be developed (e.g. in a 2x4-car formation, doors might be opened only in the 4-car set in which the guard is located).
- However, if many stations do not have full-length platforms, train loadings become uneven along the train, which removes some of the benefit of the concept.
- Moreover, the longer platforms do have to be provided at the key stations, which here refers to Central, Town Hall and Wynyard.
- The latter two stations are underground in what is probably the most built-up area in Australia.
- It is hard to see how such works could be undertaken at a reasonable cost without undue disruption.
- When combined with the difficulties of works at some of the other stations in the inner North Shore area, such a policy does not appear to have much potential.

# Signalling and control

- CityRail services are currently manually-operated using conventional signalling, enabling them to achieve 20tph.
- Other railways around the world manage to achieve higher train service frequencies, with varying levels of extra equipment.
- JRE's Yamanote line in Tokyo runs 24tph of 11-car trains, with drivers still playing a key role.
- London's Thameslink project is currently developing a 24tph service through its core, each train of up to 12 cars; 30tph has been under discussion.
- RER line A in Paris runs 30tph of 10 cars, albeit with the use of multiple platforms at Chatelet station, to overcome the station stop disadvantages of double-deck trains.
- The Munich S-bahn runs 30tph of up to 12 cars, using an LZB system just within the central core section (driving & train control elsewhere being more a conventional manually-based system), although separate platforms are provided for alighting and boarding at key stations.
- Both the Paris and Munich examples involve lines with branches accessed via some flat junctions.
- Longer trains obviously lead to longer platform reoccupation times, so 30x8-car is easier to achieve than 30x10-car or 30x12-car.
- Installation of higher-specification train control systems could easily increase capacity by 20% and up to 50% without going beyond well established norms.

# Summary: opportunity for *expanding* existing network capability

- Capacity issues are already being felt on the CityRail network, especially on the North Shore line (peak service 20tph on this core route). Demand is forecast to grow broadly by 50% by 2036.
- A programme of platform management at CBD stations is already being rolled out and more can be done to improve access and full use of the platforms.
- Simplifying the train service might unlock additional capacity by decongesting platforms (e.g. at Town Hall) and reducing dwell times further – thus allowing additional trains to be run.
- Introducing advanced signalling on selected parts of the network should enable headways to be reduced on core routes, allowing extra trains to be operated. Whilst this is not a trivial initiative, it is very do-able and relatively affordable.
- Introducing single-deck stock on selected routes could enhance throughput by reducing station dwell times and also allow services to be speeded up. Although at the expense of seat capacity per train, this could deliver all the seat capacity required for longer journeys while adding standing capacity for shorter journeys.
- Taken together these changes – and further management changes to exploit the network better - could allow investment to be deferred substantially.

# Summary: opportunity for making *best use* of network capability

- However, to exploit network capability fully, further management and policy changes can be made:
  - The development of fares policy to create a 'centre of CBD' origin/destination zone, increase absolute fares and also the ratio of peak to off-peak fares would better value scarce resources (as would making fares reflect more closely the incremental costs of longer journeys);
  - Encouraging flexitime in Government and other offices in the CBD could also transfer passengers from the peak hour to the much less crowded peak shoulder hours;
  - Land-use strategies to promote growth at rail-served centres such as Parramatta and Chatswood could be promoted more strongly, potentially combined with faster and more regular train services to such destinations, especially in the off-peak;
  - A network strategy designed to encourage more traffic to use the Strathfield – Epping link could divert passengers away from the congested core. This could be supplemented by creating a fares differential, with via-CBD fares being more expensive (pricing of expensive capacity is good economics).

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# Chapter 3b: A potential train operating plan for 2031

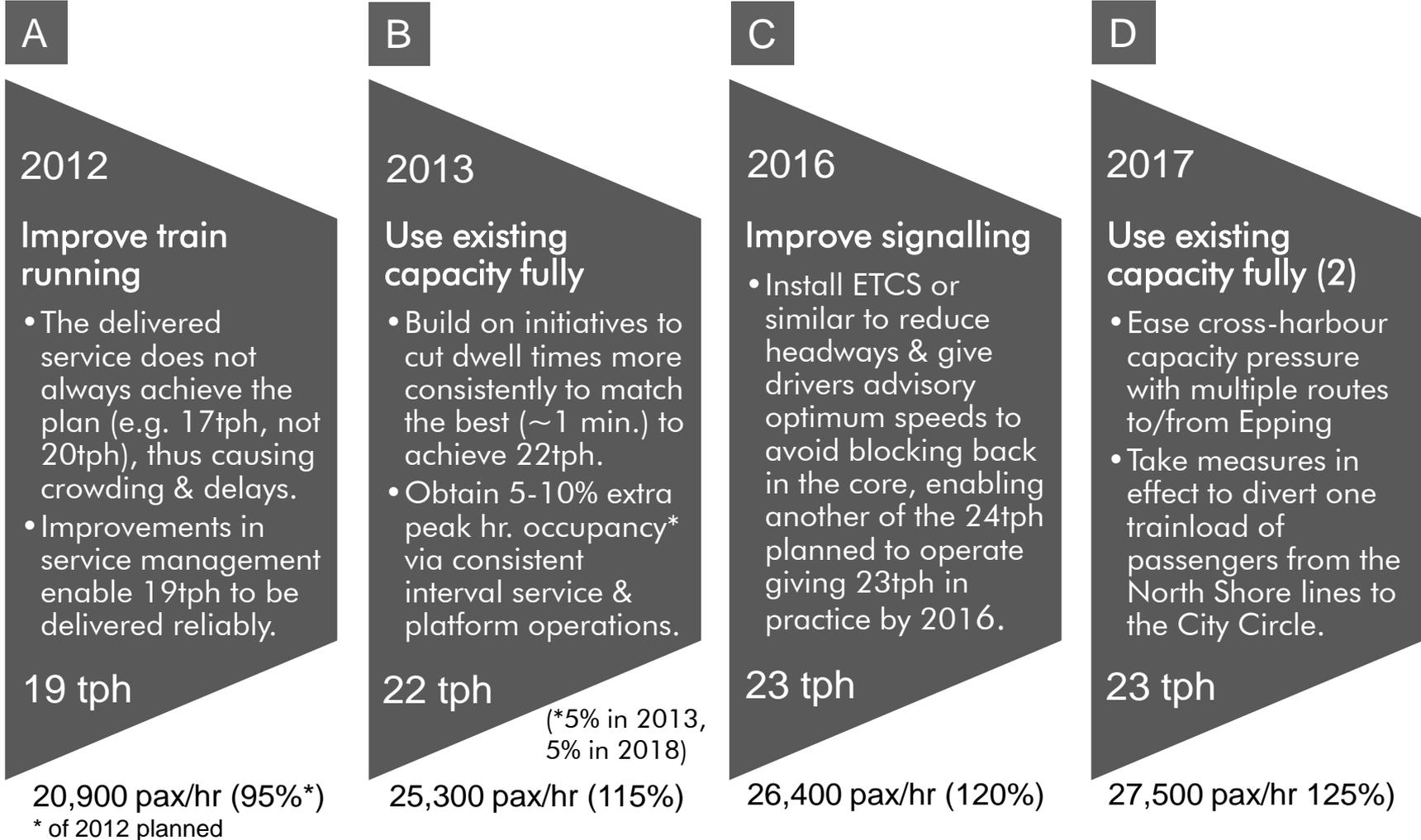
# Headlines

- In this second part of Chapter 3 we set aside the concerns we have raised regarding:
  - The lack of a rail network which relates to the City of Cities concept;
  - The impetus to reinforce the existing radial system that the major investments considered in the LTRS concentrate on.
- We proceed to set out the means by which the existing radial system can be more fully utilised to deliver major increases in capacity sufficient for the medium to long term.
- We show that measures can be taken requiring incremental investment, rather than ‘big bang’ major infrastructure projects.
- These are presented as a series of building blocks that can, taken step by step, deliver the capacity that is projected to be required up to about 2026 – 2027 and perhaps as far as 2031.
- By then the capacity of the network would be coming under renewed pressure and further, more major investment would most likely be required.
- However, in planning that investment, TfNSW will be able to take substantial benefit from the work done up to that point in terms of making best use of assets: it should be possible for the next stage of investment to be significantly more cost efficient and demonstrate a very much better business case than if it had gone ahead based on any of the LTRS options currently proposed.

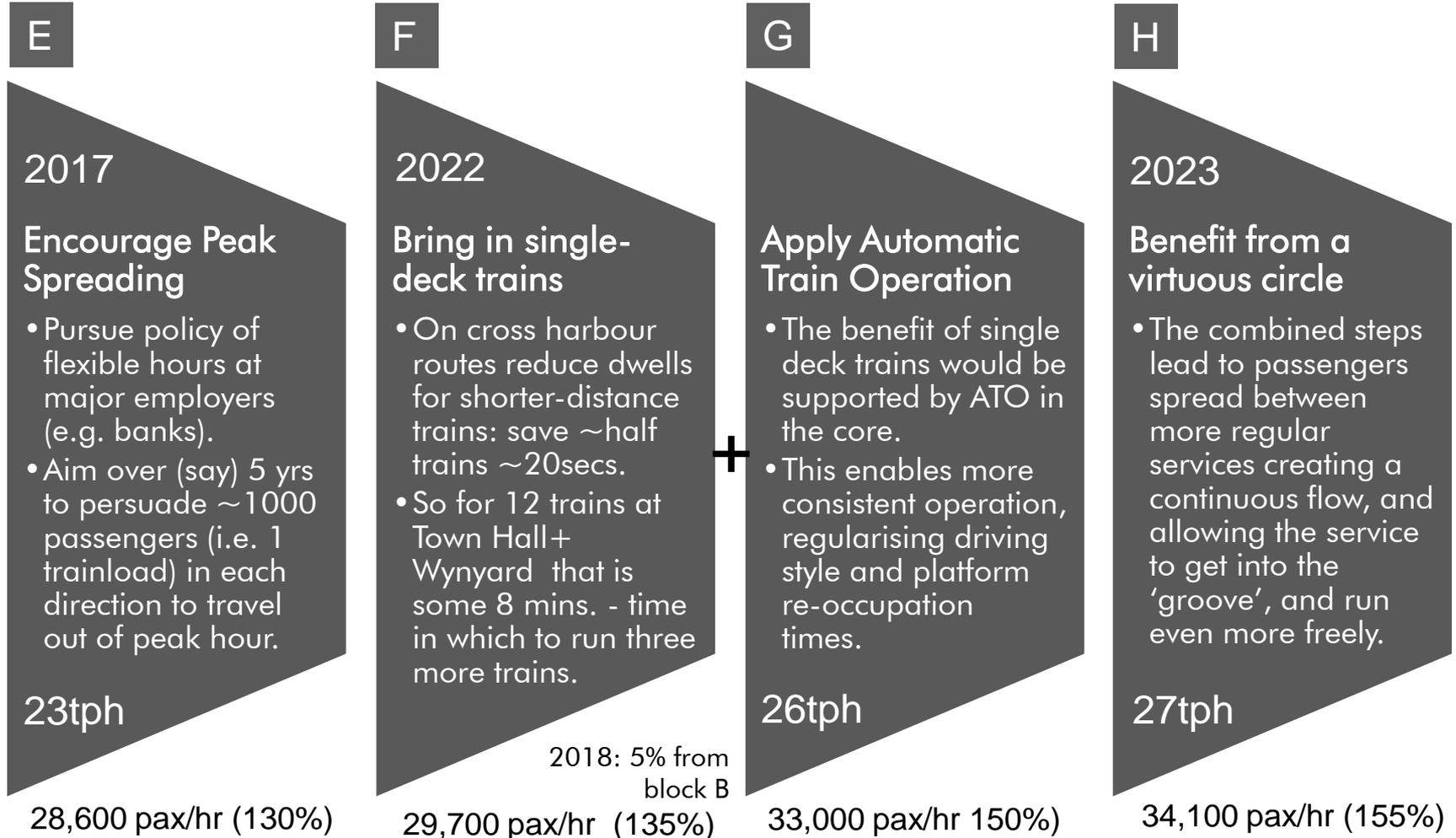
# The building blocks for a plan (1)

- CityRail is already struggling with demand and, faced with a potential 50% increase in passengers by 2031, is seeking significant infrastructure investment in order to accommodate this growth.
- However, a range of actions can be taken to make better use of the existing system and postpone major investment.
- This chapter sets out a list of such actions, and the amount of relief that these can offer, to the North Shore lines in the central area, which are under the most pressure.
- The actions either increase trains per hour (tph) or use of existing capacity more fully to give greater passenger carrying capability.
- Actions would be incremental:
  - *Improve train running*
  - *Use existing capacity fully (1)*
  - *Improve signalling*
  - *Use existing capacity fully (2)*
  - *Encourage peak spreading*
  - *Bring in single-deck trains, and*
  - *Apply Automatic Train Operation (ATO)*
  - *Benefit from a virtuous circle*
- These largely sequential steps are described in the following two slides and detailed more fully in Annex 1 to this chapter.
- The chapter concludes with a potential train operating plan for 2031, the principles and logic of which are set out in Annex 2.

# The first four building blocks for a plan



# A further four building blocks



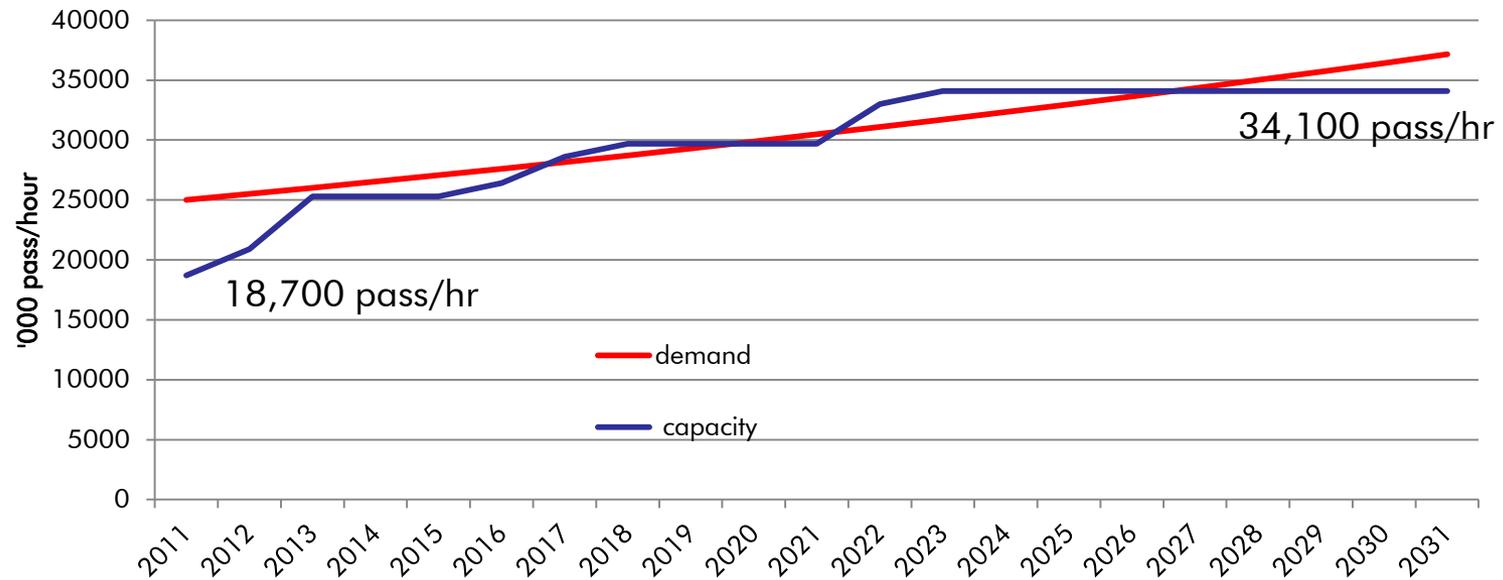
# In the plan demand is met partially by extra trains...

## Sydney North Shore Line: Growth in Peak Hour Demand v. Trains per Hour



...and partially by other means

### Sydney North Shore Line: Growth in Peak Hour Demand v. Passenger Capacity \*



\* Capacity for existing stock is assumed to be 1100 passengers per train (900 seated and 2/3 of the 300 standing capacity), and no increase is assumed for new single deck stock, although in practice carrying 1200-1300 passengers should be achievable.

# Developing the train plan to meet demand

## Demand

- The two charts, above, show meeting the demand on the critical North Shores line depends on having both train paths and fully using passenger capacities.
- The second chart of growth in demand versus passenger capacities allows for some re-direction of traffic via other routes, as described in the building blocks, but shows clear capacity to 2026/27 – with demand to 2031 not out of reach of being met.
- This is very high level and detailed demand modelling and monitoring will be needed.

## Introduction of 'Metro-style' services

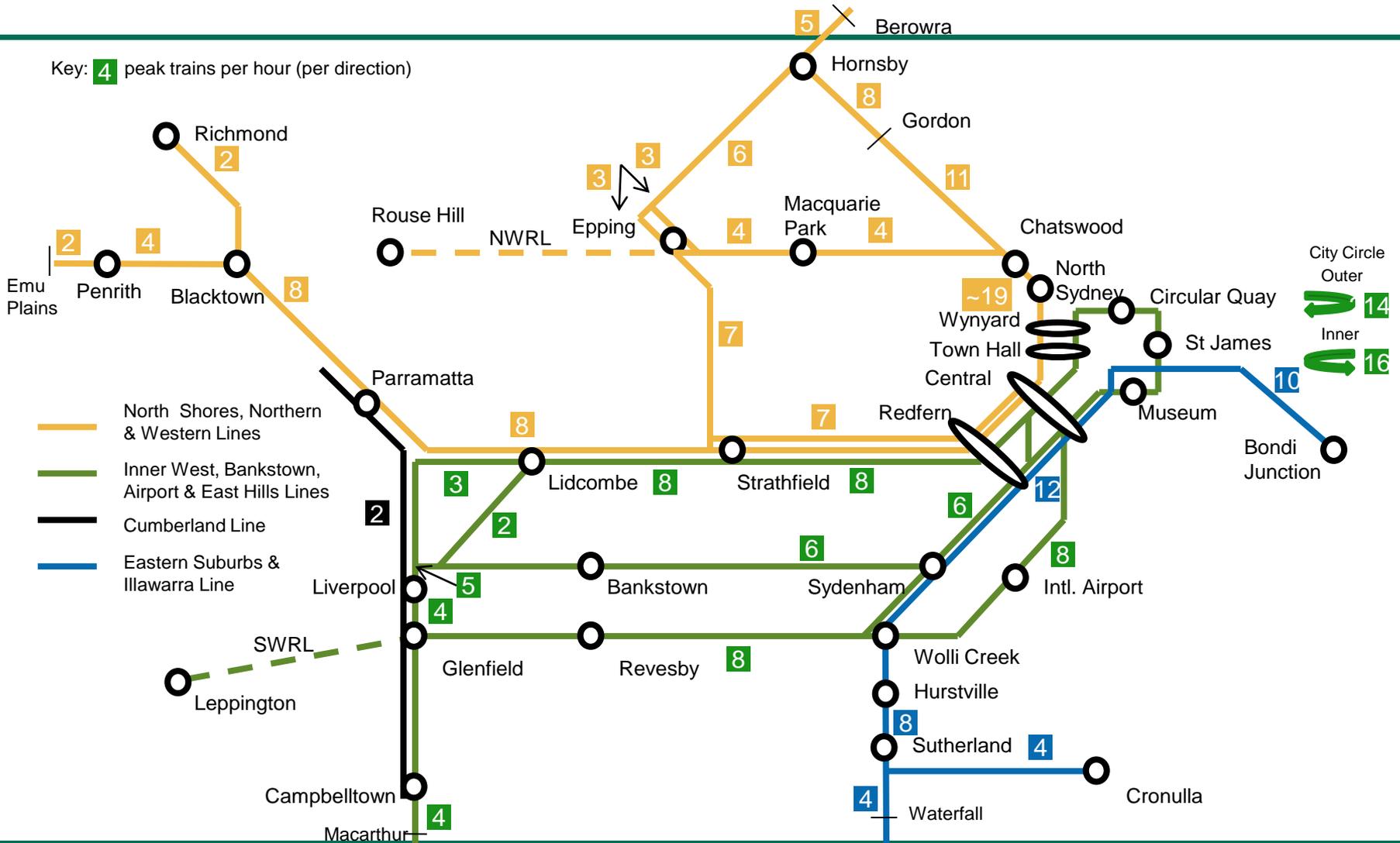
- The diagrams of the network, below, in 2011 and as it might be in 2031, show the introduction of single deck trains for a Metro-style service

- Ideally these Metro-style services (a concept put forward in some LTRS options) would not mix with other services, with sectorisation fully applied.
- Achieving sectorisation by 2031 is unlikely as existing rolling stock assets need to be exploited over their full anticipated life. This leaves scope for further improvements in due course.

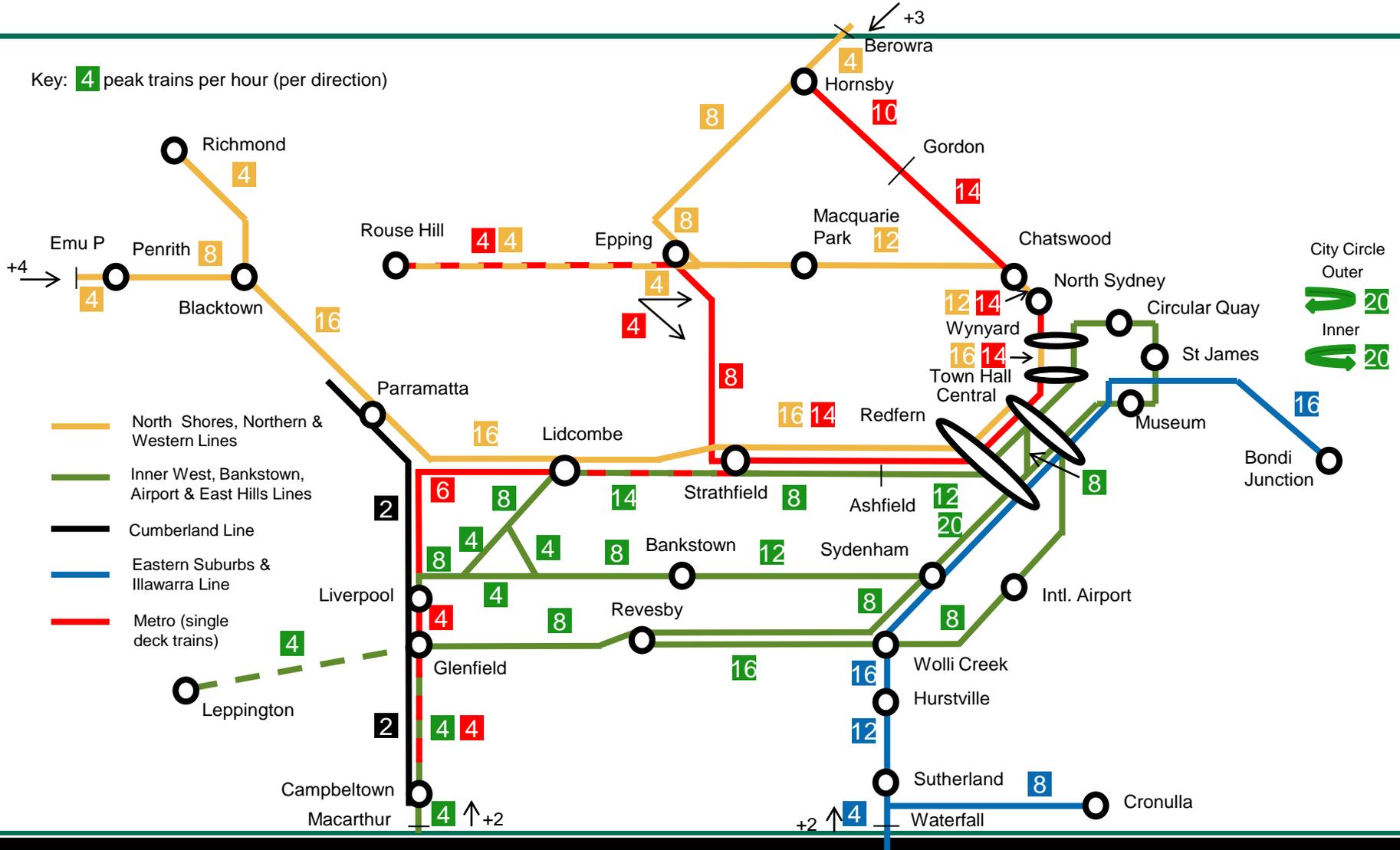
## Other Key Principles

- 4tph is assumed to be the minimum peak frequency to be attractive from branches.
- Starting/terminating more than 4tph per location is not generally shown except at Hornsby which has the turn-back capability.
- The longest-distance routes (e.g. Penrith) could include some skip-stopping to spread loads and improve journey times.

# The existing train operating plan (2011)



# A potential 2031 train operating plan



# The need for a train service action plan

- TfNSW/RailCorp, in its assessment of the risks around the LTRS Base Case, either dismissed as unworkable or did not explore the potential for a train operating plan for 2031 such as that set out above. We have presented a potential plan, not the only possible plan. It is based on a range of options that can be selected from and implemented in varying degrees and timing.
- We would expect to see other similar plans developed for comparison (before implementing sectorisation and franchising), the aim being to maximise the use of existing infrastructure in the light of Sydney's forecast economic and population growth, with limited investment - concentrating that particularly on signalling, stations and rolling stock.
- A fully detailed plan needs to be developed, with the short and medium terms actions such as those we have identified fleshed out, with each action costed, analysed for operational robustness and deliverability, its benefits appraised and a business case prepared.
- Longer term actions leading to a plan broadly of the type suggested by the Three Tier option (one of the existing LTRS options with the best BCRs) should be kept in the frame for the future, albeit modified by the experience of some ten years which will have been spent by then transforming the existing railway.
- In due course future long term plans would need testing against a range of options across the transport modes, but immediate efforts should be concentrated on developing the shorter and medium term action plan to effect the transformation the existing system needs.

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# ANNEX 1 TO CHAPTER 3A

Detailed description of the eight building blocks for the potential train operating plan for 2031

# 2012-2013: Building blocks A and B

## 2012: Building block A - Improve train running

- Congestion is currently not minimised because the timetabled peak service (of 20tph on the North Shore line) is not always achieved in practice; it is common for the delivered service frequency to be only 17tph in the peak hour, and this causes crowding on trains and at stations, as well as delays to journeys. Whilst accepting that operational problems will always arise, continued improvements in service management (e.g. ensuring that passengers are evenly-spread out along platforms, use of manual tannoy announcements by platform staff with roving microphones) should enable the average delivered train frequency of the existing service to increase to 19tph. This will build confidence in the service to allow the following steps to be made.

## 2013: Building block B - Use existing capacity fully

- Evidence from the core rail corridor in Sydney is that platform reoccupation times can already be low in international terms (e.g. around one minute) but are typically 2.5 minutes. The current programme of initiatives to provide a smooth flow of train service through this line section is clearly helpful, but it would appear that more trains could be run in this corridor even with the existing signalling. We estimate that an increase in the timetabled service to 24tph would be feasible within a couple of years, given the ongoing experiences and skills being learnt from dwell time management at Town Hall, which we understand are being rolled out to Wynyard.
- However, in practice, this would probably only deliver 22tph (compared to the 17 of 20 achieved now). There is a degree of service control available at the converging junctions at Central and Chatswood which should enable this.

# 2013: Building block B - Use existing capacity fully (contd)

- Average train loadings across the peak hour itself (not the 3-hour peak period) are currently below (in some cases, much below) train capacities. Because railway costs are significantly driven by peak requirements, this is economically inefficient (as is reflected in low cost recovery ratios).
- It is also not what is seen in other countries: for instance, in Britain, “capacity” is defined as seats + up to 35% standing (depending upon train type) but some train operators have passengers in excess of this capacity across the entire 3-hour peak period. Broadly, CityRail is carrying an average 1000 passengers/ train in the peak hour on trains with a notional capacity of 1200 (an appropriate capacity for a major wealthy country such as Australia).
- The irregularity of the service will be contributing to a failure to use capacity well (trains running on short headways are likely to be under-used whereas those running on long headways may genuinely be in excess of capacity), but this will improve as operational measures continue.
- It is not unreasonable to assume that trains can carry 50 extra passengers in the short-term (2 years), and 100 extra in the medium-term (5 years). Split between 8 coaches, these are increases of only 6 and 12 passengers per carriage. However, across the peak hour, of roughly 20 trains, this leads to a capacity increase of 1000 and 2000 passengers per hour in the short- and medium-term, equivalent to one and two extra trains.
- This leads to an assumption that capacity increases by one trainload in each of 2014 and 2018.

# 2016-17: Building Blocks C and D

## 2016: Building Block C - Improve signalling

- Improvements in signalling (ETCS or similar on key sections of the network) would be expected to reduce headways, as inter-train spacing and hence platform reoccupation times can be reduced safely, without risk of Signals Passed at Danger. Blocking-back should be reduced, as drivers are given advisory optimum speeds, thereby avoiding the delays inherent in stopping outside stations and then restarting – which leads to delays also being caused to following services. We believe that this should enable another of the 24tph planned service to be operated, giving 23tph in practice by 2016.

## 2017: Building block D - Use existing capacity fully - 2<sup>nd</sup> stage

- The network can be managed in many ways. For example the NWRL from Rouse Hill to Epping can be connected to the CBD by two routes. We recommend that under the current CityRail train specification NWRL passengers are given the choice of direct trains to the city centre both via Chatswood and via Strathfield. Our analysis shows that the running times are relatively similar by both routes. This should make it possible to encourage (e.g. through advertising and perhaps pricing too) passengers for Central to travel via Strathfield, and those for North Sydney to travel via Chatswood. As well as spreading the benefits of the new link across the network, such routings minimise the number of passengers travelling on the congested core, and hence the impact of the extra demand from the NWRL extension.

# 2017: Building Blocks D (cont'd) and E

- It should be possible to divert one trainload of passengers from the North Shore lines to the City Circle either by adjusting stopping patterns, or by substituting a Western line service for a South line train. The latter has considerable spare capacity, but still provides access from the Western suburbs directly to Town Hall and Wynyard; this therefore reduces the number of interchanging passengers at Central, as well as freeing up a train slot on the North Shore line. This might be achieved at the same time as NWRL opens.
- Note also that a proportionately-greater increase in City Circle services would (with suitable advertising) make these more attractive to passengers seeking city centre access from arrivals in the terminal platforms at Sydney (Central).

## 2017: Building block E - Encourage peak spreading

- It would appear that Sydney's office workers have more fixed hours, compared to the situation in many other world cities. Spreading the peak has been an important feature of managing urban rail congestion elsewhere (e.g. in London), with Government departments and major employers (such as banks) encouraged to pursue a policy of flexible hours around core times, which can actually lead to offices being open for longer hours than currently.
- Workers benefit because they travel in less-congested conditions, whilst there may be other reasons why, for some, travelling earlier or later may fit in with other domestic commitments.

# 2017-22: Building Blocks E (cont'd) and F

- Whilst huge change is unlikely, we believe that it should be possible to persuade 1000 passengers (i.e. one trainload) in each direction on the core route to travel either earlier or later than the peak hour over a period of (say) 5 years.
- This might require improvements in train service in the shoulder peak hours, in order to encourage them to do so, or simple but attractive off-peak multi-mode day tickets. We are not assuming any Smartcard-enabled fares incentive (which would achieve more significant results).

## 2022: Building block F - Bring in single-deck trains

- Around the world, it is not common for inner-suburban railway passengers to expect a seat. The CityRail approach of providing double-deck stock to do this, even for those on very short (e.g. 10-minute) journeys is unusual; the Paris RER, which is one of the few other systems worldwide with double-deck stock, concentrates on serving passengers from more distant suburbs. The normal situation, exemplified by the ex-KCRC lines in Hong Kong, is to provide capacity through maximising standing space, with some longitudinal seats.
- The benefits of this are to minimise the numbers of passengers left behind on platforms (who do cause genuine delays) and to minimise station stop times. This is achieved by providing more doors, and by avoiding internal stairways.

## 2022: Building block F - Bring in single-deck trains (cont'd)

- These measures typically speed up passenger flow by 0.25 pass/s/metre of door width which, for a typical number of 40 passenger movements at Town Hall (the critical station) would save 10 seconds per train (from 40s to 30s). Installation of a third set of doors would reduce flows (and hence the passenger time) per door by one-third, to around 20s.
- Over a period of one hour, in which only the shorter-distance Northern line trains were formed of more open, single-deck stock, would therefore save about half the trains 20 seconds; saving 20 seconds for 12 trains at both Town Hall and Wynyard is equivalent to 8 minutes, in which it would should be possible to run three more trains.
- As it is not clear that capacity on a double-deck train can be fully-used by inner-suburban passengers (because, for instance, the middle of 3-seat units may be unreachable, or undesirable), we contend that the crush loading of a single-deck train, with a better flow of passengers through the train, is not dissimilar. With several stations having crowding issues, single-deck trains would save time at all these stations, thereby reducing journey times.
- Another tranche of single-deck operation, for the outer-suburban lines, could be contemplated in 30-35 years' time, when the Waratah trains now entering service will be life-expired. This would create the potential for a further 2-3 tph.

# 2022-23: Building blocks G and H

## 2022: Building block G - Apply Automatic Train Operation

- ATO enables a smoother operation of all trains at more consistent speeds and headways. The Thameslink project in London is already preparing to deliver 24x12tph of a similar, multi-branch, suburban/regional railway. However, CityRail's trains are all 8 cars, and our estimates show that, with 4 cars less, these will have Run-Out/Run-In times about 2 seconds/car (8 seconds/train) quicker than London. That generates a benefit of over 3 minutes compared to the London example, which is certainly sufficient to run another train. ATO supports an extra 3 tph being achieved with single deck trains.

## 2023: Building block H - Benefit from a virtuous circle

- It should be remembered that many of the above contribute to a virtuous circle of improvement. For instance, when an additional train is run on the core section, the existing quantum of passengers is spread between more services, meaning that slightly fewer of them need to catch any particular train.
- This makes a marginal (but not trivial) reduction in station stop times, and hence enables the service to run even more freely. The best example of this can be seen in Moscow, where a 40tph metro service is operated, and passenger flow becomes a continuous stream, rather than a lumpy flow.
- The combination of measures here would be expected to add a further one tph of capacity.

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# ANNEX 2 TO CHAPTER 3A

Principles and logic behind the potential 2031 train operating plan

# Principles and logic behind the potential 2031 plan (1)

## Main principles:

- 4tph is assumed to be the minimum peak frequency to be attractive from branches.
- Starting/terminating more than 4tph per location is not generally recommended (it's possible to do this to/from just one siding, if necessary) – except at Hornsby, which seems to have very considerable capacity for turning trains.
- The longest-distance routes (e.g. Penrith) could include some skip-stopping to spread loads and improve journey times

## Illawarra/South:

- Only 4tph justified from Waterfall.
- Cronulla is busier so requires 8 tph.
- Add 4 locals from Hurstville to reach 16 tph.
- Suggest the Hurstville starters run immediately after the (semi-fast) Waterfalls (run before Southbound).
- With a couple of longer-distance services, these 16 tph are all that can be reversed at Bondi Junction.

## Cumberland:

- 2tph Campbelltown - Westmeath

# Principles and logic behind the potential 2031 plan (2)

## South West:

- 4tph each from the two termini of Macarthur & Leppington.
- Need to feed in another 4tph at Campbelltown, ideally by rearranging tracks to do this from a centre reversing siding.
- Suggest the 4tph ex Leppington run via Revesby and fast, together with the 4tph from Macarthur.
- Add 8tph slow Revesby starters via Airport, anti-clockwise; this gives two high-frequency options via a single interchange at Revesby.
- To minimise complexity between Sydenham and Redfern, it's probably better if the 8tph fast from Revesby are the 8tph which go into the City Circle clockwise.

## Bankstown Line:

- This is a busy route and proximity of stations on a two-track railway means that we can't improve journey times, so have to go for frequency to make the service attractive (pseudo-metro).
- Seek a 5-minute frequency service by combining:
  - 4tph Liverpool local via Bankstown with
  - 4tph local from Lidcombe via Bankstown
  - Another 4tph locals starting from Bankstown
  - These 12tph all to run anti-clockwise, making 20tph with the Revesby via Airports.
- To give as many through journey opportunities as possible, the Campbelltown starters should run via Granville

# Principles and logic behind the potential 2031 plan (3)

## Liverpool – Granville – Lidcombe:

- 2 (high peak hour only): these and Campbelltown starters transfer to semi-fast (suburban) tracks at Strathfield to balance track utilisation and make up the 30tph we need through the core to the North Shore Line
  - 4 Liverpool – Regents Park – Lidcombe.
  - 4 ex Bankstown line – Regents Park – Lidcombe.
  - Add 4 all-stations from Ashfield gives 12tph on local lines.

## Western Lines:

- 4tph (high peak only) Emu Plains semi-fast, to relieve longer-distance services.
- 4tph Penrith slow gives a choice to Penrith passengers.
- 4tph Blacktown slow starters.

## Richmond branch:

- This is partly single-track so 4tph is the limit
- These should run semi-fast with the trains from Emu Plains to give Blacktown an even split of slows and semis

# Principles and logic behind the potential 2031 plan (4)

## Northern and North West:

- The NWRL is being built in expectation of strong demand in that corridor, giving it both:
  - 4tph Rouse Hill via Strathfield and
  - 4tph Rouse Hill via Macquarie Park and Chatswood

which should encourage NWRL passengers to take the shortest route, thereby minimising Central area congestion

- 4tph Berowra via Strathfield, semi-fast South of Epping, for the outer-suburban service
- 4tph from Hornsby via Macquarie Park gives passengers between Hornsby & Epping a similar choice about how to reach the Central area

- Another 4tph from Epping via Macquarie Park
- 10tph Hornsby via Gordon
- 4tph extra from Gordon
- 4tph starting from/terminating at North Sydney (peak direction only)
- We do not see any particular requirements for joining North Shore and Western origins/destinations.

# In summary - per hour frequencies in 2031

- 4 Waterfall – Bondi semi-fast
- 8 Cronulla – Bondi
- 4 Hurstville – Bondi slow
  
- 2 Campbelltown – Westmead
  
- 4 Macarthur – Revesby – fast – clockwise
- 4 Leppington – Revesby – fast - clockwise
- 8 Revesby – Airport - slow – anti-clock
  
- 4 Liverpool – Bankstown – anti-clock
- 4 ex Lidcombe - Regent’s Park – Bankstown – anti-clock
- 4 Bankstown – anti-clock
  
- 4 Campbelltown – Granville - North Shore
- 2 Liverpool – Granville – North Shore
  
- 4 Liverpool – Regents Park – Lidcombe – clockwise
  
- 4 ex Bankstown line – Regents Park – Lidcombe – clockwise
- 4 Ashfield starters - clockwise
  
- 4tph (high peak only) Emu Plains semi-fast - North Shore
- 4tph Penrith slow - North Shore
- 4tph Richmond semi-fast - North Shore
- 4tph Blacktown slow starters - North Shore
  
- 4tph Berowra via Strathfield - North Shore
- 4tph Rouse Hill via Strathfield - North Shore
  
- 4tph Rouse Hill via Macquarie Park
- 4tph from Hornsby via Macquarie Park
- 4tph from Epping via Macquarie Park
- 10tph Hornsby via Gordon
- 4tph extra from Gordon
- 4tph starting from/terminating at North Sydney (peak direction only)

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# Chapter 4: A customer service plan

# Headlines

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- CityRail's commitment to customer service is undermined by the lack of connection between the fare the customer pays and the cost of delivering the service. We understand that fare rises are politically potent in Sydney but as a result customers are literally more trouble than they are worth.
- CityRail does not have the hunger that an equity owned business would have to develop its customer service ethic and sell capacity to customers – nor does it have rail competitors that act as comparators to force it towards stronger marketing and service development
- CityRail adopts much of the best practice of Customer Service Management in its measurement and reporting of its performance but there needs to be a clear mechanism for redress when things go wrong
- The size and complexity of investment planning and delivery has placed customer service delivery too low down the list of priorities for the company. The focus must shift from the 20 year horizon to the 2-5 year horizon

# Key issues from the current context

- There is commitment to good customer service practices - Annual Report 2010/11:
  - “Objective – That the services RailCorp provides continually meet or exceed customers’ expectations...
  - At RailCorp, safety and customers come first, – all day – every day”.
- This is underpinned by success measures:
  - CityRail overall customer satisfaction.
  - Service reliability – measured by on-time running.
  - Customer ease of use – measured by reduced ticketing queues at peak periods.
  - Customer comfort – reduced crowding.
- And the CityRail Customer Charter has goals relating to:
  - On-time trains
  - Manage crowding
  - Fast, accurate, useful information
  - Secure and safe travel
  - Clean trains and stations.
  - Fast ticket sales – to reduce ticket queues
  - Quick and fair complaints handling
  - Accessible services and facilities

# Current performance

## Success measures are reported to be on track:

- Overall satisfaction at 80%
- “on time” running 95.2% excluding force majeure
- Queuing measures met
- Crowding at 1.1 pax/m<sup>2</sup> in peak vs target 1.9

## And yet...

- There is no warranty attached to the Charter and redress through compensation.
- The *force majeure* decision appears to be a black box controlled by the operator.
- Engineering, disruption and investment schemes dominate literature e.g. the website.
- There is no evidence of marketing the railway to passengers, which may be unsurprising if only 25% of CityRail journey costs is covered by revenue. In effect the government is the customer.
- Each new passenger comes at an unsustainable marginal cost to CityRail – we estimate that this cost excluding rolling stock purchase costs is some \$2/journey. This means there is little incentive to keep passengers let alone recruit them at current fare levels.
- We believe that this is a root cause of why the growth CAGR for CityRail was 1.3% for 1994-2008 where as in the UK it was nearer 4% for the same period.

# Breaking the link between customer satisfaction and fares

- There is an implied belief that value and hence satisfaction is derived from low fares.
- The reality is that only 67% of passengers and 63% of commuters believe that CityRail represents value for money even though the former group are only paying on average less than \$2.50 per journey.
- In the UK where fares are much higher, the satisfaction levels (not entirely consistently recorded) are 84.5%.
- UK Research has shown that:
  - only 9% of rail users cited the main reason that they did not make more short distance rail journeys was because of cost;
  - 41% cited the convenience of car.
- We believe that the correlation between the Freeway expansion programme and rail use in NSW shows a preference for road over rail even where marginal costs are higher.
- We contend that it is right to target car users as an objective of rail transport since their recruitment brings wide social benefits and a willingness to pay for their service.
- Bruno Faivre D'arcier of Transport Economics Laboratory, University Of Lyon, says (of France):

"The users' contribution remains low. This comes from the traditional vision ... of what a 'Public Service' should be, i.e. mainly designed for low income people...a great number of vehicle kilometres are produced in low density or peripheral areas with weak results. [Now] the objective is to attract car users, which means developing high quality and level of service to compete with car. Moreover, car users have a higher willingness to pay (as revealed by the use of their car) as long as they can enjoy travel time reduction, reliability and comfort, elements they are sensitive to."

(from "How To Improve The Financial Situation Of Urban Public Transport? The French Case".)

# Selling travel disruption or journey benefits?

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Cumberland Line	Good service
North Shore Line	Good service
Western Line	Good service
Carlingford Line	Good service
Olympic Park services	Good service
Northern Line	Good service
South Coast Line	Moderate delays
Southern Highlands Line	Good service
Blue Mountains Line	Good service
Newcastle & Central Coast Line	Good service
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South Coast Line  
South Coast Line - Moderate delays

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North Shore Line Monday 26 to Friday 30 December

# Way forward for CityRail

- There should be a clear understanding that reducing the price of a rail ticket to below that of a coffee does not make the service feel valuable – fares should rise to a level where customers are valued as investment, reform and improvement is delivered.
- There is evidence of people shifting back to car as soon as road capacity is created (even with a toll). Getting people out of cars will require making rail aspirational.
- This means that rail cannot serve all members of society equally and that it must focus on its core products and corridors.
- The absence of a vibrant and heavily marketed weekend/off peak market must be replaced with a customer focussed vision for this, the only true discretionary, segment.
- Governance and ownership structures must reward retention and recruitment of customers – this can happen in a state-owned enterprise, but will happen more readily where private disciplines apply.

# What do good rail companies do to improve service?

- We argue elsewhere that a necessary pre-cursor to customer service improvement is a change to the organisational incentives through either:
  - Sectorisation of CityRail into Business units;
  - Market Testing of routes; and
  - Franchising.
- We further argue that customer service performance improvement will come through persuading people out of cars. Good transit companies know that this requires a step change improvement rather than incremental change. Key areas to tackle are:
  - A regime of compensation that is clear and easy to use
  - Station environments (cleanliness and crowding);
  - Ease of ticket sale and development of strong self-service channels and automation;
  - Good use of common and accepted technologies in other walks of life;
  - Processes that work without staff, but where staff are required that they are excellent in their presentation and interaction with customers;
  - A passion to deliver more and better rail services with network benefits (connectivity, etc..)

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# Chapter 5: An operating efficiency plan

# Headlines

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- Private sector operating practices could release some \$420m a year (2008 prices) in opex savings through implementation of DOO, reform of driver practices, station manning and maintenance practices and outsourcing some non technical functions.
- Longer term, considerable additional savings could be obtained by investment in the rationalisation of traffic management, the provision of optimally located turn backs and sidings, and the initiation of a long term plan to improve fleet availability.
- Real staff headcount reform is unlikely before 2014 due to EA2010, however, RailCorp, TfNSW and INSW need to collaborate to make the case for reform and build the political will to see the process through.
- The case for reform is undeniable, particularly when considering that funding for the investment in NWRL and other initiatives is a scarce resource.
- Any franchise or concession would need risk sharing mechanisms to allow the operator to see an upside benefit in achieving the plans and be of sufficient duration to allow a return on the investments they would have to make.

# Current situation

- The perception that CityRail is inefficient is well documented and has been studied extensively.
- LEK in 2008 identified significant potential for efficiency in comparison to other Australian operators and international benchmarks.
- A target of in excess of \$600m per annum saving is suggested to achieve parity with comparator operators.
- A report to the State Treasury in 2011 described only limited progress towards realising the savings.
- The Treasury report targets operational efficiency saving of \$156.5m per annum, which is a fairly modest goal when considered with the international benchmarks in the LEK study.
- The causes of the apparent operational inefficiency and barriers to rectifying the situation have equally been well studied; the issues can be summarised as follows:
  - Legacy practices and policies regarding safety and security of the rail system have led to significant over manning in respect to train crew and station staff in comparison to the benchmarks.
  - There is an industrial relations environment which severely impedes rationalisation of manning levels, in particular EA2010 restricts the ability of RailCorp to reduce headcount until 2014 at the earliest.
  - An investment culture and programme that emphasises relief of congestion and expansion of capacity rather than improving operational efficiency.
- Depending on the terms of any franchise or concession, it may be possible for a private sector operator to address these issues to varying extents. In the following pages the opportunities for achieving savings are identified along with an assessment of their value, their deliverability and a consideration of how a private sector operator would seek to realise them.

# Maximising rolling stock utilisation

- Achieving an efficient train operation involves optimising the train diagrams to maximise the use of the assets in revenue service and minimise unnecessary down time and empty running.
- This allows fleets to be run at high availability levels, thus avoiding paying for equipment that is not needed (this is particularly important where stock is leased or capital resource is scarce) and reduces cost from the elimination of non revenue earning mileage.
- The new stock in the CityRail fleet operates at around 90% availability for the peak service. Older stock runs at around 80%.
- These figures are not out of line with international comparisons.
- Moving to a fleet wide availability of 90% will occur over time as existing stock reaches life expiry and is replaced, on a like for like basis against today's fleet this will save around 100 vehicles.
- Assuming a cost of around \$2m per vehicle this saves \$200m in capex over approx 20 years, along with associated opex.
- A private operator may invest in higher levels of availability (i.e. modifications overhauls and maintenance practices) within existing fleets in order to provide additional capacity or timetable performance
- As is the case with RailCorp, the private sector would not invest (or indeed lease) new stock until existing stock was life expired.
- No data is available on the proportion of empty running, though anecdotally it is a significant issue. Achieving savings requires stabling sidings and turn back facilities optimised to the service diagrams.
- It is unlikely that the capital investment required to realise any savings could be justified by a private operator as the payback period is likely to be in excess of any likely franchise or concession term.

# Maintenance costs and fleet reliability

- Additional availability and reliability and benefits may be possible by the following:
  - Reform of maintenance practices
  - Consolidation and rationalisation of maintenance provision in to fewer larger, more specialised depots
  - Gradual deployment over time of single rolling stock types to each service sector, allowing specialist skill development, optimised maintenance practices and better spare inventory management
- The value of the availability benefit may be limited in terms of capacity but could enhance reliability
- Studies have identified that rolling stock maintenance costs are high and reliability low in comparison to benchmark operations.
- LEK estimated that between \$88m and \$114m per annum savings were available from reaching benchmark cost and reliability levels
- Neither the consolidation of facilities or the adoption of single fleets per sector would be a pre-requisite to other maintenance efficiency savings arising from the reform of work practices
- A private sector operator with responsibility for rolling stock maintenance would be unlikely to pursue the development of consolidated facilities due to the investment required nor would they seek to replace trains other than at life expiry.
- Nonetheless the private operator would be in a position to reform practices and it is considered that a lower level saving of around \$90m per annum should be achievable
- There will also be a economic benefits accruing to the State as a whole arising from improved timetable performance.

# Traffic management

- In common with many older railways, the RailCorp network has a mixed system of around 35 signal boxes and control centres with resultant limitations in traffic management.
- The impacts of such an arrangement are excessive headcount in signallers and reduced timetable performance.
- There is clearly a potential to consolidate the signalling control in to a small number (possibly five under a sectorised approach) of large integrated control centres (and possibly to co-locate train crew and rolling stock control in such facilities), with the expected benefit of a saving around 200 FTE positions (approx \$12m per annum).
- The timetable performance benefit cannot be readily assessed at this stage.
- Such an initiative has previously been considered, though for reasons that are not clear it was not brought into commission.
- As with the rolling stock savings, a private sector operator may find it difficult to justify funding such an initiative due to the payback period being in excess of the likely franchise term.
- If the investment were to be made by government over the period of the franchise it is possible that the operator could deliver the headcount reduction savings through natural wastage.

# Driver only operation (1)

- One of the biggest single areas of potential operational efficiency saving would be a move towards the removal of guards from trains and employing 'driver only operation' (DOO).
- Full implementation would remove the need for in excess of 1100 guard positions, while the reduction would be offset by the need to employ platform dispatchers and/or on train customer care and revenue protection staff
- A saving of up to \$200m per annum could be possible.
- The function of guards was historically two fold:
  - they were responsible for the integrity and safety of the train, and;
  - responsible for managing the platform duties, providing drivers with the authority to depart.
- Technology has made the first role redundant, while CCTV systems can allow the driver to manage dispatch themselves (with dispatch assistants where necessary).
- Guards on the CityRail system still provide the platform and dispatch role; their role has also evolved into security re-assurance offering confidence to travellers.
- This security function has been used as an argument by labour unions (not just in Australia but also in the UK) against the abolition of guards.
- However DOO has been successfully employed on many networks inc. London, Glasgow, Paris (RER), Berlin, Hamburg, Frankfurt, Stuttgart, Munich, Danish railways, Swiss railways and Dublin (DART).
- A private sector operator would be attracted to moving to DOO. The payback period for investment in CCTV equipment would be relatively short, and the re-deployment of a limited number of staff as revenue protection officers would be self financing through the collection of fares and penalty payments

## Driver only operation (2)

- It is understood that recent rolling stock orders have required the trains to be capable of operating in DOO, thus reducing the likely investment required by a private sector operator.
- It is considered that the installation of CCTV system in the carriage environment, this could be achieved within a reasonable payback period for the whole scheme.
- The impediment to DOO is the likely resistance from labour unions, a change in NSW Government policy would also be required.
- The quantum of reduction in headcount anticipated is such that natural wastage will not be sufficient.
- Compulsory outplacement programmes of the magnitude necessary are of their nature difficult to introduce, though clearly can be implemented.
- UK Private sector practice is for a complete bottom up redefinition of the total business resource need to be undertaken, with all impacted employees being required to re-apply for a role in the new organisation.
- For those employees who are not, re-employed, there will be a cost impact and therefore further extend the payback period
- Clearly such an approach requires consultation, additional benefits to those who are successful in the re-application process along with support and compensation

With ETCS and ATO available, the question of driverless operation is sometimes raised. This is typically applied only where there is excellent segregation (elevated or tunnelled tracks as in Docklands Light Railway in London, the Meteor line in Paris or Dubai Metro).

# Driver resources

- LEK estimated that CityRail drivers only spend around 35% of paid time driving scheduled services. This compares unfavourably with benchmark levels and leads to a significant over provision of driver resources.
- Around 50% of driver time is spent on 'other duties' and indicates very inefficient train crew diagramming.
- A target level of 60% driving scheduled service time would not be an unreasonable target for a private sector operator, this could reduce driver resources by around 600, with a saving of around \$50m per annum
- It is likely that any changes to driver practices and diagramming (and probably shift patterns) will be met by resistance from labour unions.
- As with DOO, the quantum of reduction in headcount anticipated is such that natural wastage will not be sufficient.
- A compulsory outplacement programme will therefore be required with associated benefits for the remaining staff and compensation for those who leave.
- Implementation of a driver resource reform programme may require modest investment in new train crew depots and rest facilities located more optimally for the service diagrams

# Station manning

- Station staff fulfil a range of functions, including ticket retailing, revenue protection, customer assistance, and platform dispatch.
- CityRail currently employs around 2500 station staff covering these functions, an average of around 8 people per station.
- Some modest efforts have been made to reform station manning levels and convert some lightly used stations to unmanned, these reduced head count by around 150 staff, though it is clear that a far greater potential exists.
- Current NSW Government policies are understood to make realising the potential savings difficult to deliver.
- The quantum of saving that could be sought by a private operator will be impacted by the development of a view on customer services, this is likely to be substantial with a target of at least \$50m per annum being considered achievable.
- There may be a requirement to offset the savings with investment in assets such as ticket barriers, help points and CCTV, however the payback period would be attractive to a private sector operator who would seek to pursue the benefits.

# Outsourcing (1)

- Outsourcing certain functions may be pursued for many reasons, with wider benefits than just headcount efficiency, the benefits of outsourcing can be summarised as follows;
  - Competitive tendering leads to improved cost efficiency and the ability to of the supplier to spread back office and equipment costs across a number of clients
  - Properly designed and calibrated payment mechanisms align interests and incentivises the outsource suppliers to provide superior levels of customer service and satisfaction. (i.e. the Channel Tunnel Eurostar service has found that on board outsourced catering staff provide higher levels of customer satisfaction than SNCF in house staff)
  - Where an activity is not core to an enterprise's in house capabilities, then it may choose to use outsourcing to transfer a risk that it is not best equipped to manage
  - Outsourcing can be used as a reform tool in situations where over manning has become endemic and difficult to change.
- In the case of CityRail the most likely candidates for outsourcing would be station and train cleaning (presentation) and security.
- These two areas currently employ around 1500 staff. It would not be unreasonable for contract supplier for these services to find up to 30% saving in headcount and/or working practice efficiency, and deliver (with appropriately designed incentive regimes) improved customer satisfaction levels.
- Investment by the suppliers in equipment and business systems may erode some savings, and the suppliers will charge a premium for any risk transfer.
- It is understood that consideration is being given to extending the outsourcing of maintenance of existing rolling stock, however, a private sector operator is unlikely to support such moves as it would constrain their flexibility to innovate and manage costs.

## Outsourcing (2)

- It is unlikely that a private sector operator would seek to outsource rolling stock and infrastructure maintenance activities on a limited risk transfer basis.
- These activities are more appropriate for consideration by a transport authority as part of full scale PPP risk transfer propositions.
- Building maintenance may be appropriate to consider for outsourcing, though with a much lower headcount and overall cost, the potential savings could be quite small.
- Overall, it could be anticipated that the saving of around \$30m per annum sought in 2008 could be achieved.
- Adopting an outsourcing approach will imply similar industrial relations issues to those for DOO and station manning, though it would be for the outsourcing suppliers to conduct any necessary job re-application and out placement programmes.

# Other possible efficiency savings

- Previous studies (notably LEK in 2008), have shown that there is potential for efficiency savings in other areas, notably;
  - Infrastructure maintenance
  - Corporate support services
  - Abolition of the transport appeals board.
- Infrastructure maintenance: LEK drew very limited conclusions suggesting that savings of up to \$35m per annum could be made.
- The knowledge on the state of the network and the degree of backlog of major renewals required appears limited, resulting in a low level of confidence in the deliverability of this saving.
- Further work will therefore be required to establish the true position before any potential private sector operator savings could be confirmed.
- Corporate support services: It is clear that many of the most readily available savings have already been realised.
- Furthermore, RailCorp would still need an element of corporate services following the appointment of a private sector operator.
- By its very nature the private sector operator would run a lean corporate service function and would be incentivised to do so in the bidding process.
- Abolition of the Transport Appeals Board: Only relatively modest savings have been identified, though it could yield benefits in terms of management focus.
- However the board is a government policy issue and its future would not be an area for a private sector operator to concern itself with.

# Summary and forward enablers

- Reform of the existing railway organisation and its operational practices followed by the introduction of the private sector into railway operations could be expected to deliver substantial savings.
- The scale of these savings has been well trailed in the LEK report of June 2008 and explored more tactically in the Treasury's RailCorp preliminary study of March 2011. Savings substantially greater than \$500k per annum could eventually be expected.
- Further savings could also be achieved through higher rolling stock fleet availability and the rationalisation of traffic management
- These additional savings would not be brought forward by a private sector operator unless financial support for the required investment was made, or the concession/franchise term was long enough to enable a return to be made.
- The biggest single impediment to achieving these savings will be resistance from the unions to what will be unavoidable and almost certainly compulsory headcount reductions.
- It is considered that following actions will be required to facilitate the changes
  - High level political will and support, a strong indication is needed of determination to see through the reforms to deliver an efficient outcome
  - The initiation of the reform process by RailCorp as part of the business process re-mapping that would arise from a sectorisation programme
  - The use of a risk sharing approach in the procurement of a private sector operator allowing the successful bidder to gain a limited share in the benefits arising from the successful delivery of the savings

# Action plan

## Short term

- RailCorp, TfNSW and INSW collaborate to create political environment that accepts the case for reform and gains support for seeing the reforms through

## Medium term

- RailCorp initiates the reform process by (possibly as part of restructuring its business more completely along the sectorised/regionalised approach already adopted) commencing the development of DOO solutions and re-mapping station management concepts.
- TfNSW initiate development of a long term fleet availability improvement programme, looking at the following;
  - Replacing existing fleets at life expiry with new stock with at least 90% availability
  - Engineering modifications and overhauls to improve availability of existing fleets
  - Development of optimally located turnbacks and sidings to minimise empty running
- RailCorp initiate development of a traffic management initiative to consolidate signalling control
- A franchise or concession plan is developed which obliges private operators to do the following;
  - Implement maintenance reform, DOO, driver practice reform and Station Manning reforms
  - Make use of rolling stock fleet availability benefits as they come on stream
  - Make use of Traffic Management benefits as they become available
- The franchises need to include risk sharing incentives to maximising the prospect of benefit delivery.

## Long term

- RailCorp needs to monitor the franchises to ensure that the anticipated benefits are delivered.

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# Chapter 6: PPP options, risks & plan

# Headlines

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- There is extensive experience of franchising in the UK, Victoria and increasingly elsewhere, such as in Germany and in Scandinavia.
- Valuable lessons learned from this experience can be put to good use in NSW, bringing to bear the considerable benefits of franchising without the uncertainty involved in being in the vanguard.
- Our view is that franchising of the CityRail network could proceed by stages based on business sectorisation, a market testing pilot with the Eastern Suburbs and Illawarra Line, with a potential private sector franchise model downstream.
- The sectors would be franchised as integrated entities including infrastructure and operations as in Melbourne rather than the UK National Rail model in which track and train are separated.
- Revenue risk would not need to be transferred to the franchisee in order to gain many of the benefits of franchising, including driving a reform agenda, while helping ensure operator stability.
- Responsibility for major capital works would not be transferred to the franchises, but retained in the public sector – although that would not exclude the use of PPPs for such works.

# Franchising and use of PPPs

- As a part of our work in setting out short, medium and long term change agendas, the remit for this review seeks a strategy for managing PPP risks – addressing lessons learnt from experiences in the UK and the State of Victoria.
- First, we look at the reasons for franchising and the benefits that can be obtained.
- Then, in a series of case studies we review the range of UK PPP models, including examples of rail franchising and concessions for operations and maintenance, PPPs including capital investments (for the upgrade of old and building of new build infrastructure), rolling stock investments and combinations of these models. We also review the experience of rail franchising in Melbourne.
- Learning the lessons of the UK and Victoria, and bearing in mind the spread of franchising in Germany and in Scandinavia, we set out possible models that could be applied in NSW, the risks that would result and possible methods of mitigating those risks.
- We then consider the implications for the CityRail network strategy, set out the options and risks associated with franchising and the use of PPPs and propose a plan.

# The benefits of franchising and PPPs

- Franchising the operation of railways to the private sector has generally been implemented to overcome entrenched difficulties with state run operations, in particular:
  - Poor customer focus,
  - Inexperience in marketing and branding,
  - Poor cost efficiency,
  - Inability to address outdated HR practices,
  - Lack of funds to invest in improvements in ticketing, rolling stock, stations, etc.
  - Consequent customer dissatisfaction with the rail services offered.
- The private sector operator is able, starting from a clean sheet, to plan and implement best practice approaches without the baggage of an existing operation to reform, and is incentivised by appropriately written contract terms (of which there is now plenty of experience) to deliver high quality services economically – resulting in improved customer satisfaction.
- PPPs are generally presented as offering the public sector the opportunities to:
  - Leverage the private sector’s abilities in delivering capital investment programmes efficiently,
  - Effective risk transfer with equity and debt tied in to stand behind delivery of the outputs,
  - Deliver value for money in on-going service delivery,
  - Obtain improved assets for public services today, while deferring the impact on the Treasury.
- Not all PPPs in the transport field have been a success but the lessons are now known and, where the conditions are right, such benefits can be realised.

# The possible models

Models considered include:

1. Concessions for the provision of - and privately funded investment in - infrastructure and trains, with train and station operation in the public sector;
2. Franchises or concessions for train and station operation and the provision and maintenance of trains (contracts with or without the transfer of revenue risk to the operator), with infrastructure provision and network operation (signalling and control) provided separately;
3. As for 2. but with infrastructure operation and maintenance also included in the franchise;
4. PPPs for new build or major upgrades/ extensions and long term operation and maintenance – or just maintenance, reimbursed with availability payments.

Other models:

- Other UK PPP experience includes metro operation in Tyne and Wear, and light rail projects in Edinburgh, Nottingham, Birmingham, Manchester and Sheffield, and in Ireland the operation of the Luas light rail system. Some of these have been highly successful and there are lessons to be learned both from those that have and those that have not succeeded.
- In Germany franchising of regional rail operations sets the private sector in competition with the incumbent state-owned DB Regio organisation, with the disadvantage for private sector bidders of having to supply rolling stock when there is no established leasing market, and yet nearly 25% of regional rail in Germany is now run by the private sector.

# Case studies to represent the models

- In the following pages we set out five case studies from the UK:
  - The London Underground PPP Infraco concessions (Model 1)
  - The passenger rail franchising model used on the UK national rail network (Model 2 with revenue risk transfer)
  - The Transport for London (TfL) London Overground operating concession (Model 2 without revenue risk transfer) and associated East London Line extension
  - The DBFOM concession for Croydon Tramlink (Model 4)
  - The Docklands Light Railway operating concession (Model 3) and new build extension PPP contracts (Model 4).
- The case study from Victoria explores the experience gained in Melbourne since 1998 from three rounds of franchising of integrated rail operations (Model 3).

# Case Study 1: London Underground PPP Infraco concessions

- LU needed substantial asset renewal and enhanced capacity - a vast/complex task.
- Leveraging private sector capabilities and efficiencies via a PPP offered an alternative.
- The LU organisation and network was divided into three Infracos and one LU operating unit which remained in public hands.
- In 2003 two PPP consortia were awarded £multi-billion 30-year Infraco concession contracts with 7.5 year review points.
- Significant risks were inherent as a result of the bidders for the Infracos having to take on assets in many cases over 100 years old.
- However, a key benefit of PPPs was undermined when only limited market acceptance of risk transfer was achieved, partly because of the asset condition risk.
- The PPP contracts were controversial and when TfL was set up as the agency responsible they and their LU subsidiary were hostile.

## Key Features

- Operation remained in the public sector.
- The Infracos maintained and upgraded the infrastructure and rolling stock.
- An output-based spec. and performance regime.

## Outcomes

- Within the first 7.5 year review period the PPPs proved unviable because of delays and cost overruns on capital works and the contracts were taken in house by LU.

## Lessons Learned

- PPPs where risks are too great to be properly transferred are likely to fail.
- PPP consortia need a supply chain they can manage and control effectively (this was not achieved by one of the consortia which was created as an SPV and dominated by its supply chain).
- Managing a large and complex brown field upgrade needs control of system operation or true alignment of interests with operator.

# Case Study 2: The UK passenger rail franchising model

- The UK model has changed more than once through several rounds of franchising.
- Infrastructure ownership and control (of signalling, train control and timetabling) is provided separately by a monopoly semi-state not-for-dividend company, Network Rail.
- Infrastructure is regulated to allow open access, but most passenger services are run as 19 franchises (TOCs) awarded by the DfT.
- A fiercely competitive market has developed of TOC-owning groups bidding for franchises.
- Franchise length has varied widely, policy having been for short (typically 7 year) terms; policy now is to revert to 15 year franchises extendable up to 22.5 years (EU limitation).
- Close specification of service levels (almost to timetable level) is being replaced with less prescription - to stimulate innovation and cost reduction, and attention is being paid to incentivising collaborative behaviours.

## Key Features

- Separation of operation and infrastructure.
- Rolling stock privatised and leased to TOCs.
- TOC takes revenue risk but with limits ('cap & collar' now out of favour; in future 'economic indicators' are to be used).

## Outcomes

- The UK passenger rail business has gone from decline to substantial growth.
- Most franchises have prospered, though some have failed (over-ambitious revenue forecasts) or been sacked (performance).
- Costs to government (especially for infrastructure) also grew but are now actively being reduced as a result of regulatory pressure and the outcome of rail value for money review (McNulty report).

## Lessons Learned

- The upsides of franchising have been much greater than the downsides, even if it has taken time to refine the model, but separate provision of infrastructure has added complexity and cost.

# Case Study 3: London Overground/East London Line (1)

- TfL took responsibility for run-down parts of the national rail network around London; let an operating concession ('London Overground'); and worked with Network Rail to upgrade the existing infrastructure.
- The East London Line project integrated (and extended) an existing London Underground line to form a part of the London Overground network.
- The project involved the upgrade of existing infrastructure – involving associated asset condition risk.
- Using lessons from the LU PPP, the decision was taken to fund the ELL project publicly.
- Using lessons from the earlier Jubilee Line extension, the scheme was let as a design-build contract with integration risk transferred to the contractor, and interfaces also actively managed by the TfL team.



Source: [Guardian.co.uk](http://Guardian.co.uk), accessed Dec.2011

# Case Study 3: London Overground/East London Line (2)



Source: Guardian.co.uk, accessed Dec.2011

## Key Features

- An operating concession (without transferring revenue risk) to run the trains and stations - using rolling stock provided by TfL.
- TfL remain responsible for ticketing and fares policy, and specifying the level of service to be provided.
- TfL are providing the (leased) rolling stock.
- TfL and Network Rail delivered the upgraded and extended infrastructure using public funds.

## Outcomes

- The operation of this 'inner orbital' rail network is providing more frequent and better quality services and this is reflected in buoyant patronage.

## Lessons Learned

- The city transport authorities have been successful through taking a hands on approach to asset improvement and service specification.
- Not transferring revenue risk concentrates bidder attention on the cost-effectiveness of service delivery to the specified standard.

# Case Study 4: Croydon Tramlink DBFOM concession

- London Tramlink is an LRT system linking the suburbs of south London, partly street running and partly on old rail alignment.
- A 99-year DBFOM concession awarded in 1996, some £125m of the £225m capital cost came from government on the basis of projected socio-economic benefits.
- Technical issues led to some six months delay in system opening (in 2000).
- Despite trams being at times very crowded, patronage has lagged (possibly optimistic) forecasts - TfL's expansion of bus services on tram routes (up 32%), is one possible reason.
- The concessionaire carried patronage and revenue risk except there was some protection on changes in fares policy (set by TfL).
- In 2008 the concession was bought out and operation taken in-house by TfL to achieve greater control and better value.

## Key Features

- New build DBFOM concession over an unusually long term.

## Outcomes

- Risks which crystallised - of delay in completion, associated cost pressures, and the revenue shortfalls - were effectively transferred to private sector which was able to sustain them.
- It is seen as a success both as a public transport system and a source of economic benefits.
- Ultimately the concession proved insufficiently flexible for TfL – and they were able to raise funds relatively cheaply for a buy out.

## Lessons Learned

- A concession of this length can be found inflexible and offer poor value for money longer term.
- The solution is shorter concessions or a regulatory mechanism to facilitate resetting the terms of longer concessions.

# Case Study 5: DLR operating concession and PPPs (1)

- The DLR was initially constructed with public funds using conventional contracting methods.
- A key feature was fully automatic operation from the outset. Rapid growth in patronage led to system upgrades and longer trains being required at an early stage.
- Operation and system maintenance was let to a concessionaire, an arrangement which has proved successful and endured.
- Extensions have been built through conventional procurements, but a 30-year PPP concession for a major cross river tunnelled extension to Lewisham was let as a DBFM. The project included commissioning in conjunction with the operating concessionaire.
- The extension scheme was successfully opened in 1999, ahead of schedule.
- A Woolwich extension was built using a similar PPP model and completed in 2009.



Source: Wikimedia Commons, accessed Dec.2011

# Case Study 5: DLR operating concession and PPPs (2)



Source: Railway-technology.com, accessed Dec. 2011

## Key Features

- Separate operating and DBFM new build PPP concessions were let to run in parallel.
- The operating concessionaire maintains parts of the network not built by the PPP contractor.
- The capital value for each project was some £200m with the contractor reimbursed via an Availability-based performance regime.

## Outcomes

- These were demonstration projects for the PPP approach with the private sector managing risk, completing capital works, bringing them smoothly into service, and integrating with the existing network, all within programme.

## Lessons Learned

- The multiple concession holder system has – surprisingly – worked well.
- The scale of the capital works project was ideal for and highly manageable as a PPP.

# Summary of UK lessons for franchises and concessions (1)

- Lessons learned from the UK franchising model have included:
  - Dividing operations from infrastructure is difficult but not impossible, and may solve certain issues on large networks (as on the UK National Rail) but certainly has not worked on a metro system (London Underground), where managing a large and complex brown field upgrade through PPPs without control of system operation contributed to the failure of the PPP model. We would not suggest separation in Sydney, either of track and trains from operation (Model 1) or between track and trains (Model 2).
  - Franchise lengths have varied and the jury is still out, but the trend is for longer franchises (15 years, extendable to 22) and to allow greater flexibility in specifying service levels – giving more freedom to innovate and address passenger needs.
  - The franchising system has delivered many positives in the UK, including customer focus and efficiency driven by competition. The passenger rail business has gone from decline to substantial growth. Investment in the quality and capacity of the infrastructure and rolling stock has therefore been necessary (and on infrastructure that is still done centrally). The need for investment is ongoing.
  - Alongside National Rail franchising with revenue risk, TfL has let operating concessions for the London Overground and Docklands Light Railway that do not transfer revenue risk and these are running smoothly, representing a lower risk/reward model which suits some types of franchise owning groups but not others who seek higher-value, market- and brand-led franchising opportunities (e.g. Virgin)

# Summary of UK lessons for franchises and concessions (2)

- Lessons learned from the UK franchising model (continued):
  - The revenue risk transfer to National Rail franchises has in the past encouraged second guessing GDP growth and, relatively rarely, franchise failure. (An operator-of-last-resort is available to pick up operation in that event.) The model is being revised to refine the risk transfer model and this is ongoing.
  - UK franchising increasingly involves subsidiaries of European State-owned railways in Germany, The Netherlands and France, and MTR Corporation from Hong Kong, as well as the UK-based private sector entities who have traditionally run franchises there, providing very strong competition. Broadly speaking, the State-owned railways tend towards the cost-driven rather than market-driven approach referred to above.
- Overall, the upsides of franchising have been much greater than the downsides, in particular if the complications of separating infrastructure and operations are set aside.
- In summary, franchising impels a reform agenda which releases latent opportunities for the passenger rail mode to play a full part in providing public transport at a time when private transport is becoming congested and increasingly unsustainable.

# Summary of UK lessons for capital works programmes

- Lessons have been learnt in the management of engineering and technology risks and the structuring, financing and integration of complex capital projects. It is clear that the procurement method is no guarantor of good or bad cost or programme delivery. There is no 'right' approach - the method of procurement and delivery needs to be tailored carefully to suit the project:
  - For well defined green-field civil engineering and systems integration projects not too large to be procured as a single package, a PFI approach using DBFM contracts can be effective even with operation being run by a separate concessionaire (DLR).
  - Green-field DBFM&O concessions can be procured but once a scheme is in operation, to balance the interests of the public and private sectors, it could be helpful to have a regulatory mechanism in place to allow flexibility and ensure value for money for the public purse over the longer term (Tramlink).
  - Highly ambitious leveraging of private sector efficiencies in upgrading large brown-field systems via DBFM Infraco concessions while operation is very much alive and still in the public sector has been found to be unsuccessful - highlighting the importance of access and the futility of transferring risk when no party will take the real downsides (LU PPP).
  - Conventional Design & Build contracts for the upgrade and extension of brown-field systems which are able to be closed to operation for the duration can be successful, especially if a suitably experienced client can support the integration function (ELL).
- East London Line represented a retreat to public sector provision, while learning lessons from previous projects. Other major projects are taking similar approaches. Given current public sector budgetary constraints further use of private finance offers a solution – but only if future projects are developed and packaged with that in mind, and the lessons learned are applied.

# Case Study 6: Passenger rail franchising in Melbourne (1)

- Following a period (from 1989) aiming to transform metro rail into a service-oriented operation (rather than system/supplier-oriented), corporatisation was introduced in 1998 followed by franchising in 1999.
- The whole operation remains integrated with infrastructure and rolling stock maintenance and train and station operation let together.
- Met Train was split into two entities, won by Connex and National Express, but these were combined again under Connex in 2004 after NX withdrew from it's franchise having sought, but not obtained, increased subsidy.
- Connex, which suffered some operational difficulties, was supplanted on re-letting in 2009 by Metro Trains Melbourne, a combine of Hong Kong's MTR Corporation and two Australian infrastructure firms.

## Key Features

- Vertical integration of infrastructure and operation, with track and rolling stock leased to operator.
- Revenue risk is transferred to operator - currently with 'cap and collar' and 'reset'.

## Outcomes

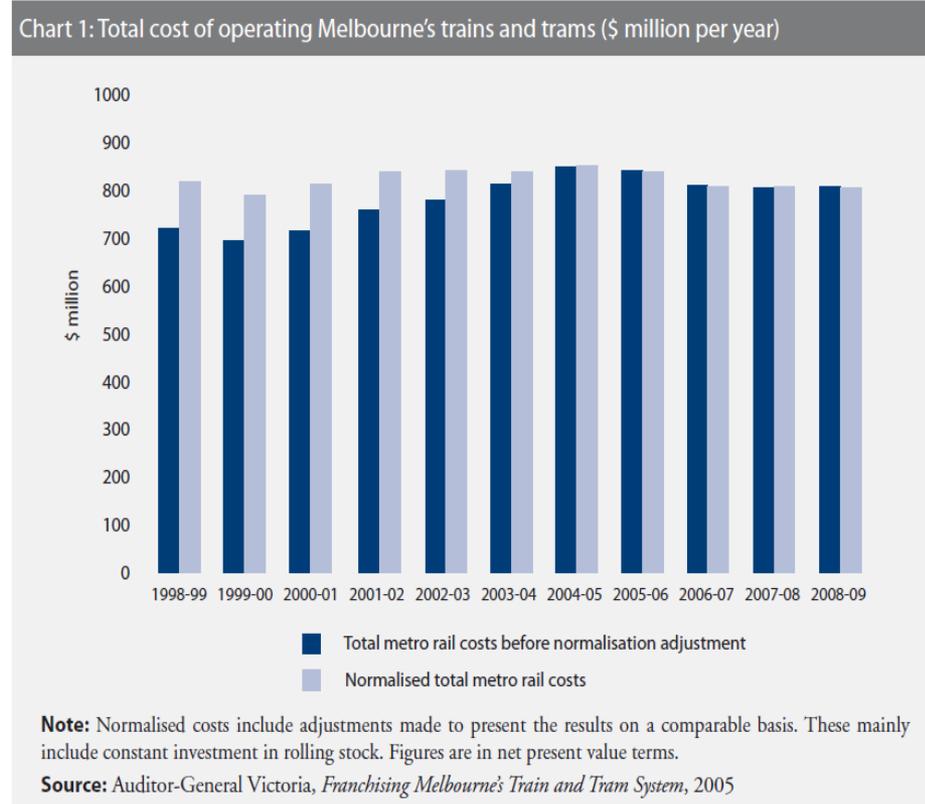
- A troubled history with operators either withdrawing because of revenue shortfalls or losing credibility (and re-let) appears to have been overcome in the third letting round.
- Strong patronage growth is continuing, putting pressure on capacity.

## Lessons Learned

- Refinements in the risk terms have made franchises more robust.
- Attracting high calibre, committed and financially secure bidders is essential.

# Study 6: Passenger rail franchising in Melbourne (2)

- Some researchers have debated whether any savings have emerged as a result of privatisation.
- An Institute of Public Affairs report (“Victoria’s public transport, Assessing the results of privatisation”, Richard Allsop, Apr 2007) finds that savings to taxpayer have not matched bidders’ projections and overall costs remain similar.
- However, this ignores the major cost reductions made immediately prior to franchising, something that has not so far happened in New South Wales, and the substantial operational, performance and risk-transfer benefits that have occurred.
- Indeed, the normalised costs quoted by the Auditor-General Victoria (see Chart 1 opposite) do appear remarkably flat - in marked contrast to inexorably rising costs reported in Chapter 2 above for NSW.



# Case Study 6: Passenger rail franchising in Melbourne (3)

- In 2005, the Auditor General for Victoria published a document to assess whether the franchising of Melbourne's Train and Tram system was value for money for the public and whether the responsible agencies:
  - Effectively managed the process of developing the new franchise agreements, and
  - Incorporated lessons learnt from the 1999 franchising process.
- The report said:

"Our overall conclusion is that the current train and tram franchise agreements represent reasonable value-for-money (assuming that franchisee performance meets contracted levels). This conclusion is principally based on our assessment that the payments the government negotiated with the train and tram franchisees were close to the best possible prices it could have negotiated for the sustainable operation of the metropolitan train and tram system."



Source: Wikimedia Commons, accessed Dec. 2011

A key feature of the restructuring was the period of commercialisation, changing the rail system into rail service, and efficiency improvement prior to franchising (also limiting the HR risks for the private sector).

# Implications for franchising in Sydney

Considering franchising for Sydney opens numerous questions:

- What are the aims and what model matches them?
- What, if any, division into sectors is appropriate?
- Who will provide (and fund) the infrastructure?
- Who will provide (and fund) the rolling stock?
- Who will operate stations?
- Who will carry revenue risk?
- Who will specify the services to be provided?
- Is this for capital works as well as operations?
- How is performance to be incentivised?
- How is co-operation with RailCorp to be ensured?
- How can the workforce be taken along with this?
- How is it to be made politically acceptable?
- How are other pitfalls to be avoided?

We now explore these points in light of the lessons learned.



# The aims of franchising and a proposed approach (1)

## Aims

- Our remit from Infrastructure NSW is to develop and test the hypothesis that a private franchisee might propose an efficient long term rail strategy; we can assume that cost efficiency and the reform required to drive that is high on the agenda – impacting both subsidy for operations and capital funding provision.
- Other aims can be expected to include:
  - Maintaining the highest level of operational safety;
  - Meeting public expectations for service levels and crowding;
  - Maintaining high levels of reliability, punctuality and service quality;
  - Improving rail's modal share including off peak patronage;
  - Transferring risk to the private sector;
  - Allowing for private sector funding to be leveraged, possibly off the government's balance sheet (e.g. for ticketing, rolling stock).

## Approach

- Based on the lessons set out in this chapter, our view is that the basis of franchising should be fully integrated infrastructure and operations - with freedom given to innovate.

# The aims of franchising and a proposed approach (2)

## Approach (continued)

- Given the network size, we consider it sensible to reduce the risks associated with the process by breaking the operation down, using the tiers and sectorisation as a basis, into several franchises and to phase the transition. (N.B. In Melbourne the two initial franchise operations were later re-merged and a unified franchise approach should not be ruled out for further consideration.)
- Giving responsibility for upgrades and expansion works to franchises can be considered, but UK experience suggests this works best only with green-field or relatively modest capital schemes such as investment in stations, CCTV, ticketing systems, etc.
- Investments with a pay back longer than the franchise term would be made possible by introducing end-of-franchise residual value terms into franchise agreements.
- Rolling stock would (as in Melbourne) either be sourced from TfNSW or leased separately as appropriate to the needs of the franchise and to deal with life expiry of existing stock.
- Franchise terms would initially be kept relatively short (between 5 and 10 years) with longer terms considered once experience with franchising has been gained.

# Detailed franchising proposals (1)

## Division into Sectoral /Tier Franchises

- New business sectors should be aligned with Clearway routes to maximise operational independence.
- CityRail Suburban and CityRail Intercity services may be franchised together where rolling stock is shared or possibly by tier if distinct (metro) rolling stock is operated.
- As a pilot, the Eastern Suburbs & Illawarra Line should be prioritised for market testing/ franchising
- Consideration could be given to combining all the routes using the City Circle into one sector/franchise.
- The Western and North Shore Lines could form a future single franchise but services that terminate at Central could potentially be separated from those Metro-style services that continue across the harbour bridge.

## Infrastructure and Rolling Stock

- Infrastructure would be maintained (non-capital works) and operated by the franchisee.
- Rolling stock would be maintained by the franchisee or his outsource supplier.
- Where new rolling stock (not available from TfNSW) is required it would be leased from a supplier (we note the current procurement is a PPP).

## Stations

- Stations would be maintained and operated by the predominant user franchise.

## Service Specification

- We envisage this being retained as a responsibility of TfNSW, but set down at high level, leaving the franchisee freedom to offer innovations and improvements.

# Detailed franchising proposals (2)

## Fares and Ticketing

- We suggest responsibility for this would be retained by TfNSW.

## Revenue Risk

- Under a cautious approach to franchising, revenue risk would not be transferred to the operator but would be retained by TfNSW to help ensure franchise stability. If an off-peak patronage bonus were incorporated, for example, this would still capture many of the benefits of franchising, including driving improved customer focus as part of reform.
- The alternative of transferring revenue risk could lead to greater levels of innovation. Although using lessons learned it is possible to avoid excessive risks being taken by bidders, this model aligns better with intercity-style services rather than for high density metro-style services.

## Performance Regime

- A performance incentive regime will need to be set up covering as a minimum reliability, punctuality and a range of service quality issues, linked to the payment regime.

## Capital Infrastructure Works

- We envisage these remaining the responsibility of the public authorities except possibly in cases of renewal works or minor upgrade works.

## Safety Regulation

- A safety regulator will be required to review safety cases and ensure compliance.

## Economic Regulation

- Consideration should be given to the need for a regulator to determine (or arbitrate on) the cost impacts of changes to the service specification, etc.

# Five top risks of franchising and how to mitigate them

## Five Top Risks

1. Greater organisational complexity increases integration and safety risks.
2. Re-organisation costs together with transaction costs are excessive such that they are not recovered through efficiency savings.
3. Politically driven disagreement means that contractual relationships between franchisees, RailCorp and TfNSW become adversarial and co-operation is not achieved or breaks down.
4. The workforce is overwhelmingly hostile such that co-operation breaks down and service disruption becomes severe.
5. Operators misjudge operating cost savings that can be made and cannot afford to continue to run the franchise.

## Probability, Impacts and Mitigations

- The probability of Risks 1 and 2 occurring can be considered Low – avoiding this depends on careful, informed execution, applying lessons learned from elsewhere.
- The political and HR issues in Risks 3 and 4 must be considered High probability risks. The impact could be show stoppers.
- Mitigations for these High probability and High impact risks can only derive from two stages of pre-planning at a detailed level:
  - The building of political and organisational will to deal with these issues, and
  - Once the political will is there, the preparation of a comprehensive and war-game tested HR plan, agreed at the political level.
- Overcoming Risk 5 will depend on bidders having clarity regarding the degree of political will to make efficiency savings.

# Realising the benefits of capital investment

- Realising the full benefits of making major investments in public transport when resources are scarce depends on developing and delivering prioritised schemes affordably:
  - Building the necessary consensus, securing consents and funding through rigorously prepared business cases underpinned by credible construction, systems, operational and commercial planning;
  - Planning for the infrastructure, railway systems and rolling stock to deliver the required outputs and procure them, avoiding process pitfalls and delays;
  - Completing the project, integrating the elements which make it up, managing the risks of cost overruns, delays and system outputs falling short of those planned;
  - Bringing the newly completed system safely into operation on time and to deliver a high performing public transport service.
- For completed systems to become sustainable financially they need to operate reliably and provide an attractive offer to customers so revenue potential is realised.
- Their operating costs also have to be strictly controlled.
- The level of public subsidy required for ongoing operation should be justified in the original business case rather than be a response to failures in the development or ongoing operation and maintenance phases.
- There is extensive experience in the UK and elsewhere of different models, including PPPs, for successfully delivering capital investment on time, on budget and delivering the outputs on which the business case is predicated, provided the right choices are made.

# Action Plan

## Short term (1 to 3 years)

- Complete detailed review of options for franchising, confirm model (testing against a unified franchise model), undertake business case review, establish political and organisational backing.
- Undertake market soundings and refine model if required.
- Review sectorisation of RailCorp, confirm precise sectors to maximise independence, optimise for franchising and complete RailCorp re-organisation into sectors to create customer focus, commercial orientation, drive through major efficiency savings.
- Set out a detailed programme for franchising and make preparations for franchising the first sector (potentially the Eastern Suburbs and Illawarra Line).

## Medium term (3 to 5 years)

- Run competition to award the first sector franchise.
- Preparations for franchising the second sector.

## Longer term

- Run competition to award the second franchise.
- Review of franchising based on experience to date – incl. contractual terms and franchise length.
- Refinement of the franchising model.
- Preparations for and franchising of the remaining sectors.

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# Chapter 7: Conclusions & way forward

# Conclusion

- This report describes an alternative future for CityRail that is far removed from the one currently in prospect: as an increasingly unaffordable yet also under-valued, if important, operation likely to be constrained by a lack of funds to invest in capacity expansion.
- The alternative future can be characterised by:
  - An operating plan that seeks to maximise the use of the existing CityRail network with relatively modest investment principally in signalling, stations and rolling stock;
  - A customer focussed vision, turning CityRail's system into a service that is highly valued by its users;
  - Major improvements in CityRail's operating efficiencies to offer customers and the taxpayer real value for money - thus releasing significant funds for investment; and
  - The application of transformational private sector disciplines and innovation through the progressive introduction of franchising.
- The aim of private sector involvement will be to spur the reform necessary to achieve real change.
- Long term investment in the railway infrastructure, stations, and rolling stock (as well as in ticketing, marketing and customer facing functions) will remain essential if the railway is to fulfil its function of providing an alternative to congested street-based public and private transport.
- Hence the development of longer term investment strategies to follow on from the North West Rail Link should not be deferred too long, but the timing will depend on the success of TfNSW and RailCorp in handling the short and medium term in a sustainable manner.

# Background trends and future plans

## Growth projections

- Over the last decade investment in other transport modes (motorways) has kept back growth in rail patronage - and the appetite of the railway to attract new customers.
- But rail is growing steadily, putting pressure in particular on services to the CBD, and over the next 20-25 years patronage is expected to grow by some 50%.

## Resources employed

- Over the last five years staff numbers have risen at more than 3% per annum and salary costs by some 6% per annum,
- Costs per passenger journey are also rising, suggesting declining productivity, and yet fares have been static.

## Cost recovery

- This is less than 25% compared with over 50% in New York and Montreal.

## Capital investment

- Investment has also risen dramatically over the last few years to some \$1.5 billion per annum. Were current plans under the LTRS to be approved, the capital requirement would remain at or above this high level annually for the next 10 years and more.

## LTRS options and their appraisal

- All options under consideration by TfNSW assume that the construction of the CBD Relief Line is a necessity.
- No options have a benefit/cost ratio of more than 1.0, suggesting at best poor value, although appraisal work is incomplete.
- The appraisal for such a major programme would normally include other transport interventions for comparison.

# Transforming the operational train plan

## Building blocks

- We have identified eight steps or building blocks to enable better use of the existing system and postpone major investment.
- Analysis is presented of the North Shore lines in the central area and a list of eight timed actions from 2012 to 2022/23 that will increase train paths or otherwise increase capacity where it is most under pressure:
  - *Improve train running*
  - *Use existing capacity fully (1)*
  - *Improve signalling*
  - *Use existing capacity fully (2)*
  - *Encourage peak spreading*
  - *Bring in single-deck trains, and*
  - *Apply Automatic Train Operation (ATO)*
  - *Benefit from a virtuous circle*

## Meeting demand for 15 to 20 years

- The capacity provided by the actions we have set out shows projected growth in passengers being accommodated until 2026/27 – with demand to 2031 not out of reach of being met.

## Introduction of Metro services

- A key feature of the plan is the introduction of single deck trains for a Metro style service on the North Shore lines from the CBD north and west to Strathfield and beyond.
- Ideally the Metro services would not mix with other services, with full sectorisation applied.
- Achieving full sectorisation by 2031 is unlikely as existing rolling stock assets need to be exploited over their full anticipated life. This leaves scope for further improvements in due course.

# Transforming customer service

## Principles and concepts to apply

- Low ticket prices do not *per se* make a service feel valuable – fares should rise so customers are valued as improvement is delivered.
- There is evidence of people shifting back to car as soon as road capacity is created (even with a toll). Getting people out of cars will require making rail aspirational.
- This means that rail cannot serve all members of society equally and that it must focus on its core products and corridors.
- The absence of a vibrant and heavily marketed weekend/off peak market must be replaced with a customer focussed vision for this, the only true discretionary, segment
- Retention and recruitment of customers needs reward and this can happen more readily where private-sector disciplines apply.

## Actions to be taken

- A necessary pre-cursor to customer service improvement is a change to the organisational incentives through either:
  - Sectorisation of CityRail into Business units;
  - Market Testing of routes; and
  - Franchising.
- Persuading people out of cars is key and this requires a step change in *culture*. Key areas to then tackle include:
  - A clear and easy to use compensation regime;
  - Cleanliness and crowding, incl. at stations;
  - Developing strong self-service;
  - Good use of technologies common elsewhere;
  - Processes that work without staff, but where staff are required that they are excellent in their presentation and interaction with customers;
  - A passion to deliver more and better rail services with network benefits (connectivity, etc..)

# Transforming operational efficiency

## Opportunities for greater efficiency

- Reform of the existing railway organisation and its operational practices followed by the introduction of the private sector into railway operations could be expected to deliver substantial savings.
- The scale of these savings has been well trailed in the LEK report of June 2008 and explored more tactically in the Treasury's RailCorp preliminary study of March 2011. Savings substantially greater than \$500k per annum could eventually be expected.

## HR issues

- Resistance from the unions and passengers to headcount reductions will be a key constraint to be overcome.

## Actions required

- It is considered that the following actions will be required to facilitate the changes:
  - High level political will and support: a strong indication is needed of determination to see through the reforms to deliver an efficient outcome;
  - The initiation of the reform process by RailCorp as part of the business process re-mapping that would arise from a sectorisation programme;
  - The use of a risk sharing approach in the procurement of a private sector operator allowing the successful bidder to gain a limited share in the benefits arising from the successful delivery of the savings.

# Applying private sector disciplines through franchising

## Approach

- Learning the lessons of franchising in the UK and in Melbourne, the benefits of private sector disciplines can be gained by franchising fully integrated infrastructure and operations - with freedom given to innovate.
- Given the network size, the risks associated with the process can be mitigated by breaking the operation down into several franchises, using the tiers and sectorisation as a basis, and to phase the transition.
- Revenue risk need not be transferred to the operator although some off-peak patronage incentive would be appropriate.
- Giving responsibility for upgrades and expansion works to franchise operators can be considered particularly for green-field or relatively modest capital schemes.

## Short term actions (1 to 3 years)

- Confirm franchising model, review sectorisation to maximise sector separation. v. a unified franchise.
- Undertake market soundings.
- Complete RailCorp re-organisation into sectors to create customer focus, commercial orientation, deliver major efficiency savings.
- Prepare for franchising the first sector (e.g. the Eastern Suburbs and Illawarra Line).

## Medium term (3 to 5 years)

- Run competition to award the first franchise.
- Preparations for franchising further sectors.

## Longer term

- Review of franchising experience to date, refine the franchising model, continue franchising and refranchising.

# Reminders of other issues to be followed up (1)

## Investment appraisal

- The need has been flagged in Chapter 2 for investment decisions to be taken in the light of alternatives from across the transport modes, public and private, to give best value for users and taxpayers across multiple criteria.
- This enables sub-optimal investment decisions to be seen correctly as such and helps ensure that scarce funds are placed where they can achieve the best outcome.

## Interface with land use planning/development

- In Chapter 3 reference is made to land use pressures and passenger demand in the CBD.
- In theory, the need for the land use planning and transport strategies to be aligned is well understood in Sydney.

- But it is unclear, given that the many local/City authorities have responsibilities for planning and the State for transport that the linkages are in reality fully functional.
- LAs (and the State where it has land holdings) are not necessarily held financially responsible for the implications of their land use decisions on transport.
- Although LAs may have regimes for levying developer contributions, the links that should be made explicit between the location of property development (public and private) with the financing of public transport provision to facilitate it is apparently lacking.
- An alternative feedback loop from the transport authorities to the LAs and Cities signalling where public transport can be provided most economically appears to be the minimum requirement.

# Reminders of other issues to be followed up (2)

## Transport Network Diversification

- Reference is also made in Chapter 3 to demand in the CBD being seen as a lack of capacity on existing lines rather than a lack of a network, and so efforts have concentrated on reinforcing existing patterns.
- The concept of network diversification goes hand-in-hand with the City of Cities concept, and investment options needing to be considered for their contribution to that, building Greater Sydney's transport network, not just connecting the suburbs to the CBD alone.

## Recommendation

- If the conclusions of this report are adopted, longer term investment planning will be 'paused' while the shorter and medium term issues are resolved
- However, it is strongly recommended that by the time longer term planning of major infrastructure resumes, the three issues referred to as 'reminders' here have been explored and clear policies put in place to deal with them.