

## 20120914 Sydney Commuter Rail Missing Links

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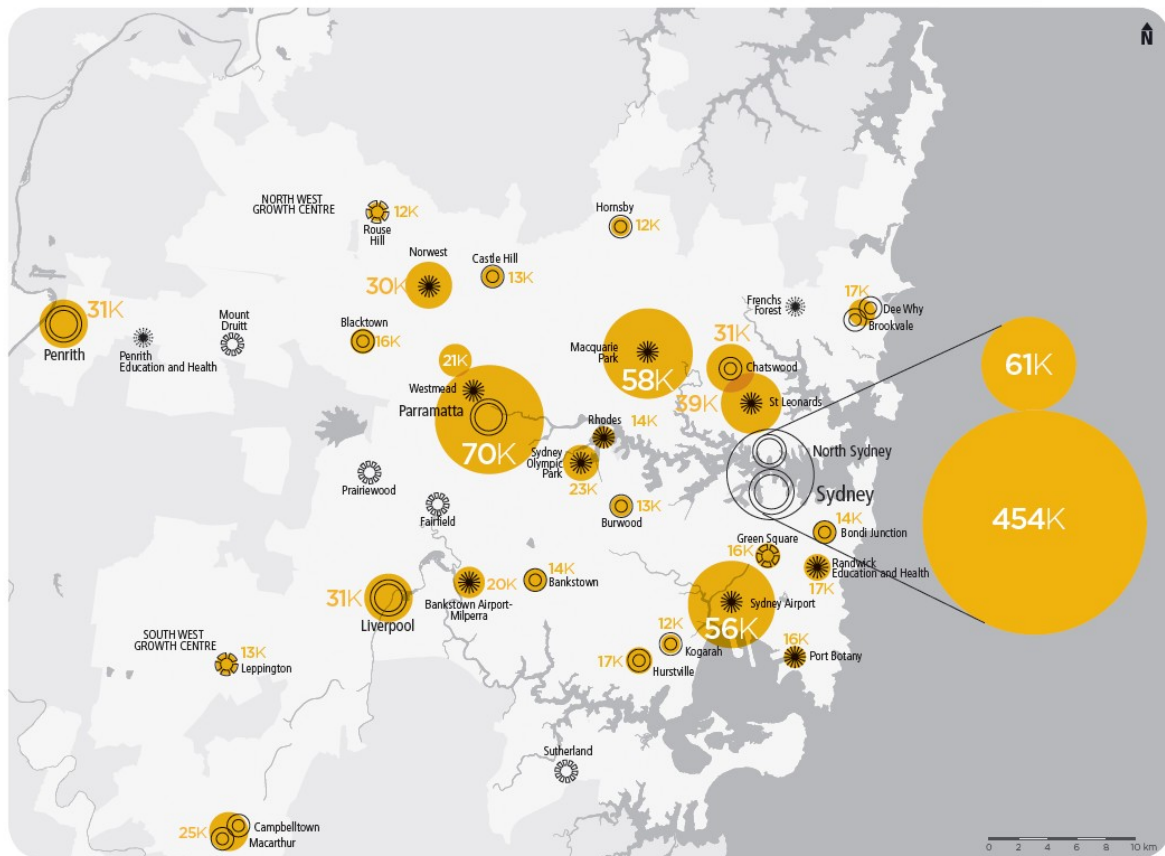
14-Sep-2012

### Introduction

The Draft Transport Plan for Sydney's Heavy gauge commuter service was recently addressed in the document Sydney\_s\_Rail\_Future\_-\_high\_resolution[1].pdf that is currently available from a user-friendly website<sup>1</sup>.

In that document, Figure 1, shown below describes the expected employment centres in the Sydney Basin by 2031.

Figure 1: Major employment centres Sydney 2031



Source: Transport for NSW

This picture shows that by 2031, the Sydney CBD is still shown as the major commercial hub with about half of the total employment being shown as there. If this figure is to be believed, then it must also be assumed that these pie chart values relate to standard working hours on an 8:00 am to 5:30 pm basis.

What we do know from life experience is that in the Sydney Basin a very sizable proportion of people commute considerable distances to and from work, sport and entertainment. Inter-Urban workforce is real and is sizable, as these people choose to not live in the Sydney Basin but in the Central Coast, Wollongong and the Blue Mountains.

<sup>1</sup> <http://haveyoursay.nsw.gov.au/article/sydneys-rail-future>

We also know that the price of oil-based fuel is rising well above the consumer price index (CPI) and within a decade<sup>2</sup>, using road vehicles may not be a feasible option for the majority of current motor drivers. So this will again change the use of rail services from a peak-hour based structure into an almost continuous basis structure.

The figure above relates to those people working and does not relate to locations of prime sport and entertainment. If the planning for the future (rail) transport is to be done properly, then the plan has to think well beyond peak work hours and make the train commuting infrastructure available on a 24/7 basis so that the Flywheel Effect can make the train service a realistic facility.

### ***The Flywheel Effect***

The Flywheel Effect<sup>3</sup> is where the supply of a facility is put in place to provide service to a certain section of business or community. Because the facility is both regular and available, other people in the business or community find the service facility and use it, making the service facility in more demand than it would otherwise be. So the supply of the service is then increased which in turn increases the demand for the supply – hence the flywheel effect!

A shopping centre is a typical example of the Flywheel Effect where a large range of shops are in a close defined area, so the shoppers can walk between shops and purchase a range of goods in a very short time. The corner stores are then far less frequented and eventually move to a shopping centre or close down.

Sydney's current commuter rail infrastructure fosters the heavy servicing of the Sydney CBD at the expense of lesser CBDs and the "much lesser" suburban stations (just like the "corner stores" as alluded to above).

Consequently, this rail infrastructure, if left in this form will continue to have a number of bottlenecks near to Sydney CBD that naturally impinge on the whole commuter rail network being highly efficient and/or prevent the current rail network structure from providing the service that the potential customers would want.

That is: this Sydney Metropolitan rail infrastructure will to continue have high management, maintenance and consultancy overheads, together with a generally low occupancy with the exception of those commuters that are extremely inconvenienced by having services at their doorsteps at the times they need to use this infrastructure).

### ***Western Line Bottlenecks***

It is highly unsurprising that the Sydney's Rail future document proceeds to bemoan about the current problems of the current backbone structure – the link between Central station and Parramatta station.

Figure 2a below shows the stylised structure of the Western Line with a list of internal complaints that have not been resolved in several decades.

The list of internal complaints with associated blue squares to show where these are is highly reminiscent of the dog sitting on a thorn and howling because the thorn is

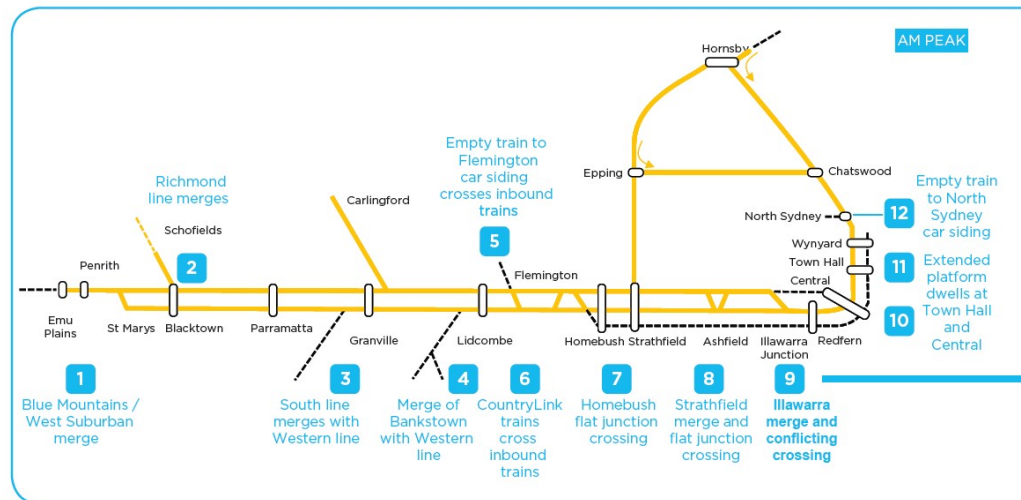
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<sup>2</sup> Jeff Rubin "Why Your World is about to get a Whole Lot SMALLER", Random House Canada, 2009, ISBN 978-0-307-35751-9 <http://www.energybulletin.net/51409>

<sup>3</sup> Jim Collins "Good to Great" [http://www.jimcollins.com/article\\_topics/articles/good-to-great.html](http://www.jimcollins.com/article_topics/articles/good-to-great.html)

hurting its' backside. The dog does not get up and move to remove the thorn – it just keeps howling. The pain still remains.

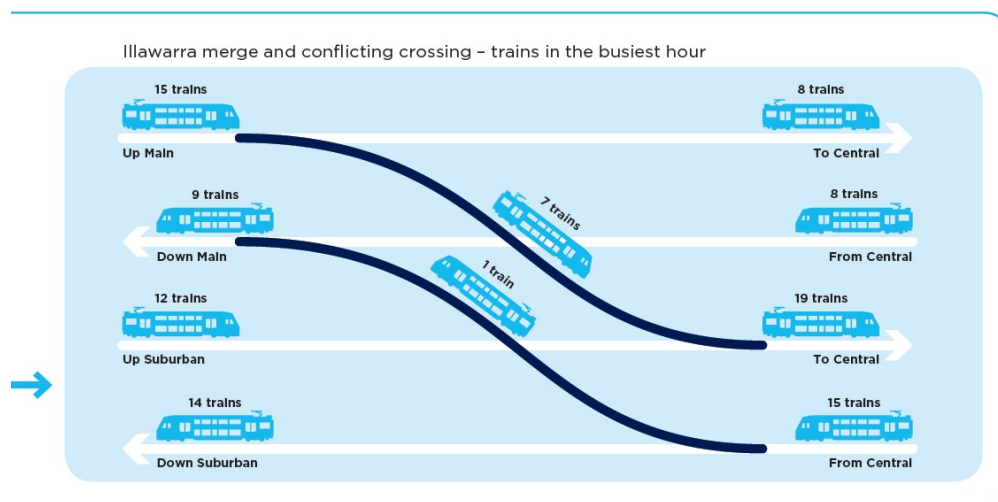
Figure 2: Complexities on the Western line – bottlenecks



It seems that these rail complexities have never really been addressed and that is probably because the management is self focussed as Line Management and not Network Management. *(My father, who was a Solicitor, taught me well that if a problem seems very complex to resolve, then the problem is not being viewed from the right perspective. When the right perspective is applied then the problem is rather simple to resolve.)*

Apparent problem areas 1, 2, 3, 4, 7, 8, and 9 are all about lines merging. To me this sounds very much about Line Management Ownership and not about Network Management Coordination. (The right perspective to resolve this problem.)

If the Line Management Ownership were removed, then this would give the focus across into restructuring the use of various lines and placement of junctions so that merging is the natural and not the problem, as it is currently seen.



The second part of this farcical set of excuses relates to the second part of figure 2 as shown below that highlights internal complaint 9:

Apart from the “in-house” language of “Up Main, Down Main, Up Suburban, and Down Suburban”; **this problem seems to be rather simple to resolve by putting in a pair of ramp overpasses (or underpasses), near Central or Redfern, and/or reposition the platform usage to minimise crossovers.**

With this simple change in line structure the one train From Central on the “Down Suburban” line connecting to the “Down Main” line never interferes with the 12 trains from the “Up Suburban” line.

With this simple change in line structure the seven trains from the “Up Main” line would then never interfere with the eight trains From Central using the “Down Main” line as they connect with the “UP Suburban” line To Central.

The upside of this relatively inexpensive infrastructure rebuild is that this really opens up Central Station to feed out and receive trains from more than just the Western Line, and more than just the Main and Suburban “highways”.

### ***Limited Ownership = Myopic Management***

The other upside of this internal complaint 9 is that this clearly shows that there is a Main Line (ownership) and a Suburban Line (ownership) issue that needs to be brought into a common Rail Network Management structure.

Taking this argument one step further, there is also a Freight Rail infrastructure that also needs to be wholly integrated with the rest of the metropolitan rail network so that the network can be managed with a common consistency of purpose, which is one of the core 14 Quality rules<sup>4</sup> as spelt out<sup>5</sup> by J Edwards Deming<sup>6</sup> in total Quality Management<sup>7</sup>, which is the core of excellent business standards, and minimising Union interruption and/or interference of effective supervision and maintenance.

Some years ago the then State Government went on a crusade to “Untangle” the metropolitan rail network. The stupidity of this strategy was that really nothing happened other than the seriously foolhardy strategy to sell-off this parts of this vital State-owned infrastructure in little bits and pieces.

One of the lessons not learned was when the Airport Rail Link was sold off as a privatised interest, the end user costs became so great that most people avoided using the rail service to and from the city or elsewhere, and the road congestion is now even worse than before the Airport Rail Link was put in place.

The only way to fix this problem is to buy this part of the network back from private interests and integrate the Airport Rail Link back into the metropolitan rail network and resume comparative end user prices as are currently being used elsewhere in this publicly owned rail network.

It seems that those that advised the NSW Government officials to sell off the rail infrastructure were totally uneducated about the nature and purpose of Infrastructure business<sup>8</sup> and totally focussed on Competitive business. This reasoning would

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<sup>4</sup> [http://www.who.int/ihr/training/laboratory\\_quality/15\\_c\\_annex\\_process\\_improve.pdf](http://www.who.int/ihr/training/laboratory_quality/15_c_annex_process_improve.pdf)

<sup>5</sup> <http://www.qualityregister.co.uk/14principles.html>

<sup>6</sup> [http://en.wikipedia.org/wiki/W.\\_Edwards\\_Deming](http://en.wikipedia.org/wiki/W._Edwards_Deming)

<sup>7</sup> [http://scholar.lib.vt.edu/theses/available/etd-07052011-165326/unrestricted/Ho\\_PV\\_D\\_2001.pdf](http://scholar.lib.vt.edu/theses/available/etd-07052011-165326/unrestricted/Ho_PV_D_2001.pdf)

<sup>8</sup> <http://www.moore.org.au/comp001.htm>

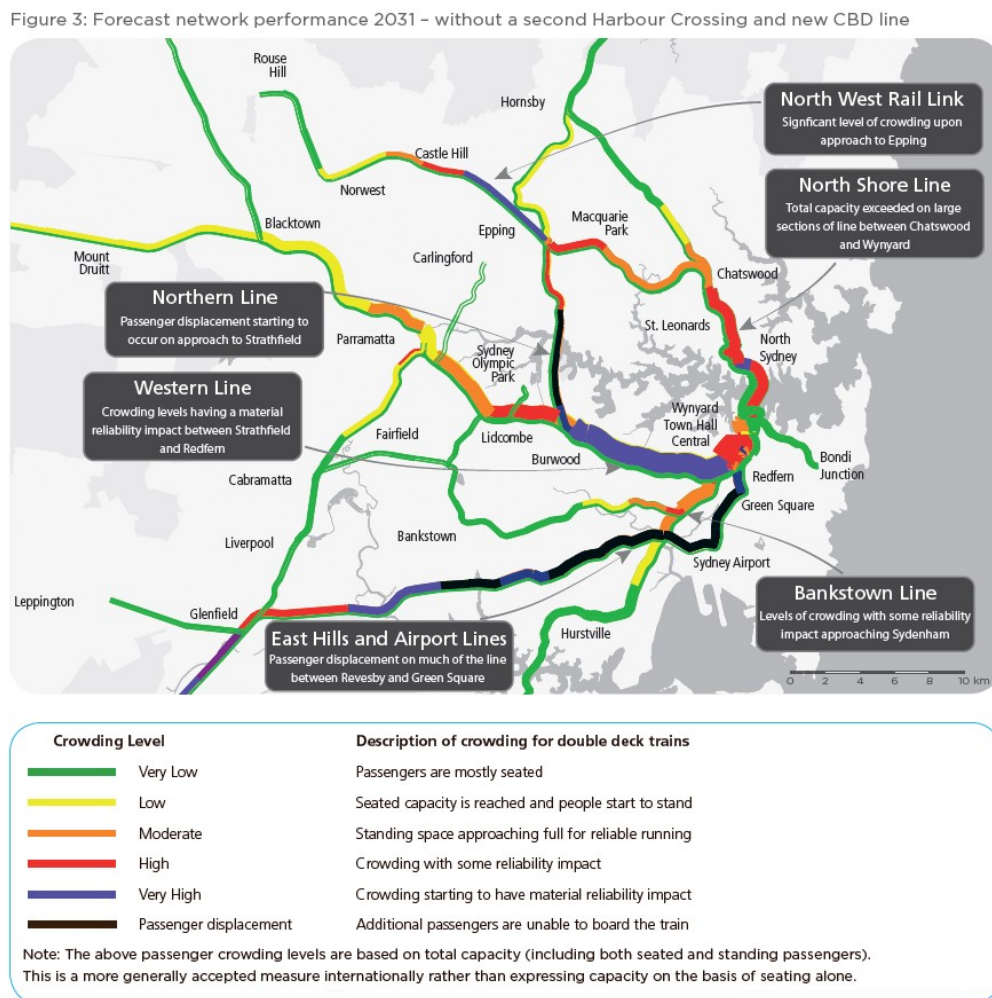


explain why the advisers got it so wrong, and continue to repeat this fundamental economic error.

At least then there will be a far larger volume of commuter traffic on the rail services between the Sydney Airport Terminal Stations and the CBD, which will in turn really free up the road bottlenecks near and in Sydney Airport, and substantially reduce the number of personal commuter road vehicles parked and transiting Sydney Airport.

### ***Forecast Rail Usage 2031***

Figure 3 from the publication Sydney's Rail Future is shown below:



Source: Transport for NSW

This is a very interesting picture for a number of reasons, particularly when taken in context with Figure 1 above showing the CBD workforce placement, without taking into account entertainment locations, and sporting locations and education locations as these locations are also potential major users for commuter rail infrastructure, but not necessarily at the same times as those using rail transport for work commuting.

### ***Fundamental Commuter Rail Flaw***

What I found most interesting about this picture was that from Central, the structure of the commuter rail network is essentially a STAR, so by far the biggest congestion will have to be in Central / City Circle and as the distance from Central increases so the frequency and usage of the trains exponentially decreases.

There is a fundamental problem here in that a large proportion of Sydney's suburbs are a mixture of homes on standard land blocks, and medium density home units. It

really it does not matter which suburb is considered, the population densities are amazingly consistent from suburb to adjacent suburb.

Looking at this situation a little deeper it becomes very obvious that Central station and the City Circle have the absolute lions share of commuter rail services and the outer-lying suburbs (which would really benefit from having frequent and regular rail services) are rarely visited apart from peak hour.

So, by direct association with the Flywheel Effect as mentioned above (page 2), the potential commuters that are not in the inner city do not have the rail transport services provided and so use cars on roads as the preferred means of transport between suburbs for shopping centres / entertainment venues / sports facilities etc.

Currently, a very high proportion of commuters in the Sydney, North Sydney, St Leonards, Chatswood and Parramatta CBDs use rail transport because it is at their doorsteps almost any time of day.

Figure 5: Sydney's Rail Future - A Three Tier Railway

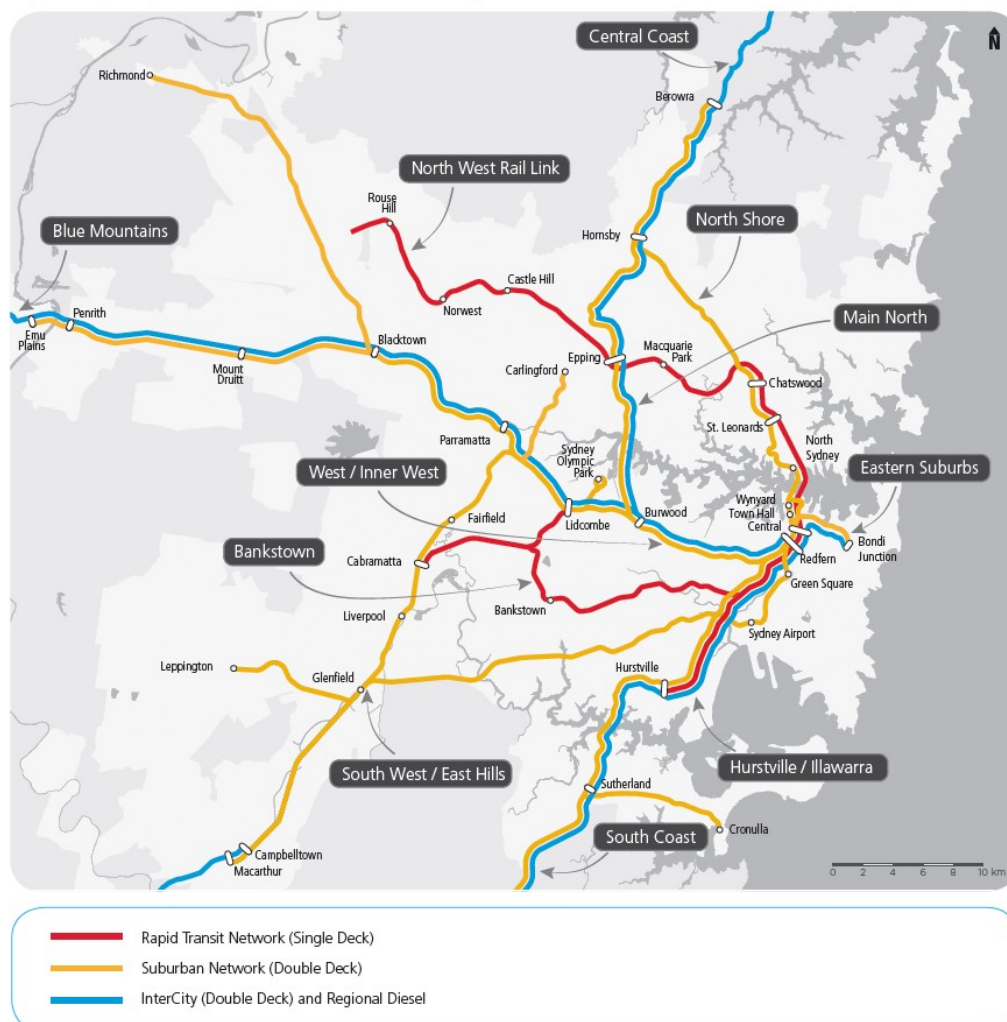


Figure 5 above shows how the fundamental problem is now being programmed to be made much worse than it currently is. There are a number of historical reasons that have made this list of excuses somewhat plausible but not acceptable.

## ***Restructuring Sydney's Rail Star Network***

As said several times before, the fundamental structure of the Sydney Commuter network is that of a STAR with the centre being Central station and the City Circle loop. Historically this STAR structure made sense, but with the growth of Sydney past Strathfield (in the 1940's / 1950's) very little has been done to make the network highly productive.

*In my previous roles as a Forward / Planning / Maintenance / Network Engineer / Manager etc, in Telecom Australia / Telstra / Nortel etc, I caused and saw the dramatic improvements in operating efficiency through setting up networks as intersecting rings / loops, and commuter / freight rail network / services are no different than communications networks.*

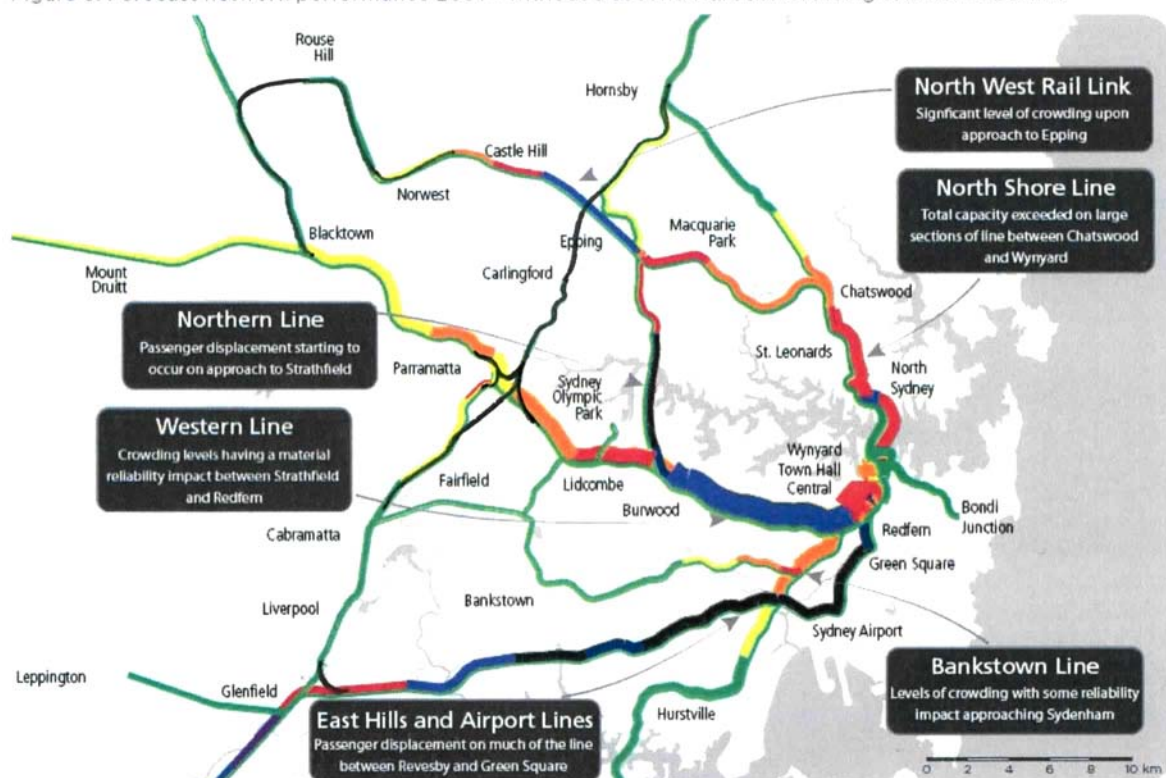
## ***Replace Line Management with Network Management***

It seems that the prime blocker is management control of the various lines as ownership and not management control of the overall network as a coordinated infrastructure, so before any meaningful development is to take place, the NSW Government needs to decree that all the rail infrastructure belongs to the one body (Transport NSW), and that body is to manage the development and maintenance of the whole rail network – not just parts of it.

## ***Extend Star Network Spurs into Loops***

The reason for this restructuring change is that the entire rail network needs to be looked at as a number of LOOPS that INTERSECT and/or run parallel in common routes to provide high capacity services. This strategy is in diametrically opposite to the strategy in the current Draft Master Plan 2012, which is still a very fragmented approach where rail lines are still separately managed.

Figure 3: Forecast network performance 2031 - without a second Harbour Crossing and new CBD line



The reasoning for strategising a series of rail loops is that this provides a consistent and frequent level of service to every station in these loops, and it provides a

regularity of services so much that potential passengers would not need to look for a timetable, but simply turn up to a platform and within 10 minutes a train would be going the way they wish to go.

Looking at Fig 3 above, this is the same network as shown in the document with the exception that four short tracks have been added to dramatically change the structure of the Sydney Rail Network.

There are eight fundamental changes to the structure of the existing / proposed Sydney metropolitan rail structure and they are as follows:

- Join the proposed North-West line to the Richmond line to form a loop
- Move Rose Hill station north by about 600 m
- Put in a rail tunnel to remove the Parramatta Road Level Crossing
- Put in a rail tunnel to connect Guildford to Rose Hill
- Put in a tunnel to join Carlingford to Pennant Hills
- Put in a dual overpass near Redfern to untangle the Illawarra lines
- Put in a tunnel to join Rose Hill to Parramatta
- Join the East Hills – South lines to form a loop

These eight changes to the planned and existing rail network in the Sydney Basin will have a dramatic effect in simplifying the operational procedures, provide a consistent flow of rail services at a far larger number of stations and move rail transport to be the major commuter transport mode to and from all CBD's in the Sydney Basin.

The following areas provide more detail about these proposals to radically improve the current Draft Master Transport Plan with respect to the Commuter area of that draft document.

### ***The North-West Loop***

At the north-western end of the proposed North West Rail Link<sup>9</sup> at Kellyville, this track is about 5 km away to the east of the Blacktown - Richmond line.

This inclusion to make the loop would make absolute sense, in that the rail corridor must be slightly extended right now to connect with Riverstone – heading back towards Blacktown - so that the rail service is then part of a continuous loop with North Sydney, Central.

This loop continuous high capacity double-deck train service would then be **Epping – Castle Hill – Rouse Hill – Riverstone – Blacktown – Seven Hills – Toongabbie – Pendle Hill – Westmead – Parramatta – Lidcombe – Burwood – Redfern – Central – North Sydney – St Leonards – Chatswood - Macquarie Park – Epping!**

As shown in the picture above Castle Hill is shown as a high usage area but within a few km each side the usage apparently falls away rather fast (as it was a spur on the end of a STAR network). By putting the connecting loop at the end of Kellyville into Riverstone, this provides a bi-directional path for very frequent train services back into Blacktown as well as Parramatta's large CBD.

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<sup>9</sup> <http://northwestrail.com.au/>



This proposed northern / western Sydney loop would pass through a large number of residential and CBD areas making the catalyst for commuting between these centres both quick and reliable, and that is just what commuters want!

### ***Relocate Rose Hill Station***

Part of my earlier Freight Rail strategy (Sydney Basin Rail Link)<sup>10</sup> was that a proposed dual tunnel be constructed between Carlingford and Pennant Hills. The Carlingford line would then connect almost straight, all the way through Hornsby in Sydney's North Corridor towards Newcastle.

In that proposal the new rail line south of Rose Hill was to transit under the M4 and Parramatta Road in a dual tunnel joining with the South line about 600 m north of Guildford station. This rail link would then create an almost straight corridor directly joining Sydney's North and South corridors, and would be a major game changer to really minimise Australia's road freight congestion through the Sydney Basin.

The commuter rail link component south of Rose Hill crosses under James Ruse Drive and level crosses Parramatta Road near Granville – Clyde. A complete rethink of this structure is imperative because this level crossing has to be removed and relocated such that these paths do not interfere with each other, and do not decrease the transit speeds of their own infrastructures.

The proposal to move Rose Hill station North by about 600 m makes the gradients into that tunnel much easier and provides the space to maximise the radial arc for the for the proposed Rose Hill – Parramatta tunnel is maximised to about an 800 m radius. Camellia station can then be removed, being too close to Rose Hill Station.

Currently much of the land adjacent to the rail tracks in this area is being used as a car park for Rose Hill Racecourse. Moving Rose Hill station North would take up some open land, but South of the proposed moved station the proposal is to split the tracks into three sets, and gradient down to a tunnel entrance.

The Western pair of lines would feed in a new tunnel to connect with Parramatta station as described below. The centre pair of rails would run under the M4, Parramatta Road, the Western Line and connect into the South line, North of Guildford, as described in the earlier proposal Sydney Basin Freight Rail Link. The eastern pair of rail tracks would run under the M4, Parramatta Road, Duck Creek and surface near Clyburn station as described in the next section of this proposal.

These earthworks would considerably change the nature of the existing Rose Hill Car Park and my proposal is that a multi-level car park be erected over the descending rail and tunnel infrastructures, much like the car park in the south of Sydney CBD north of Central station between Elizabeth and Castlereagh streets.

This proposed multi-level car park would be easily serviced by James Ruse drive, and the rail link to Parramatta station from Rose Hill station would provide a very quick connect to the Parramatta CBD area.

The Silverwater Rail bridge is Sydney's third "harbour rail crossing" that to date is extremely under-utilised.

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<sup>10</sup> <http://www.moore.org.au/senh/2012/20120809%20Sydney%20Basin%20Freight%20Rail%20Link.pdf>

## ***Parramatta Road Tunnel***

Currently the Carlingford line has a level crossing at Parramatta Road, which is near the Parramatta CBD area.



Not only is this level crossing a major safety hazard, it also causes considerable congestion to Parramatta Road, and the Carlingford line because these paths are mutually exclusive because of this level crossing. This level dual lane road/rail crossing needs to be removed and repositioned so that road traffic will not be hindered by considerably increased rail traffic.

Because of severe network congestion (of Parramatta Road, James Ruse Drive, the M4, the Western Rail, the Carlingford Line, three Creeks and many buildings) in this vicinity, I would very strongly recommend that the rail connection between the Carlingford line and Guildford, and the Carlingford line and Clyde / Clyburn / Auburn be restructured as two tunnel pairs starting at about Rose Hill Station / Car Park in a southerly direction.

For the proposed Guildford (South Corridor) connection I strongly recommend that a dual tunnel proceed as described in the Sydney Basin Rail Link<sup>11</sup>. This link would provide a through connection from Sydney's South corridor up through Sydney's North Corridor with very few bends, so this rail freight line can be quick, quiet, and comparatively (to road freight) have a very low carbon footprint.

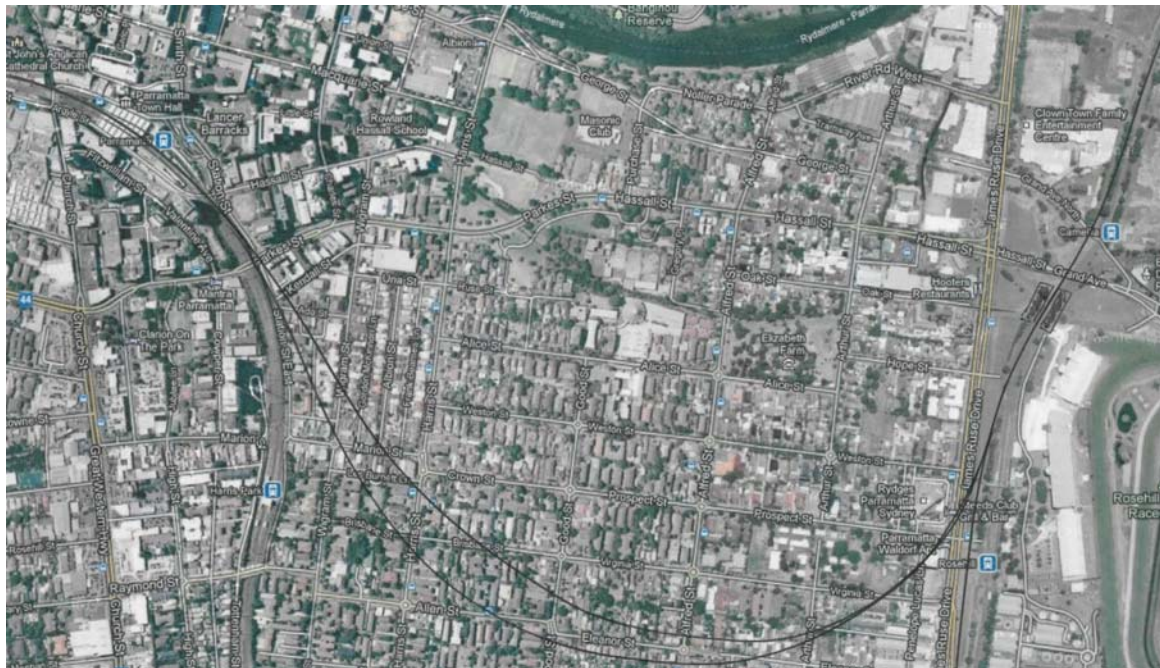
For the Clyde / Clyburn / Auburn connection, I am strongly recommending that a Tunnel pair be constructed from Rose Hill Station / Car Park and remain east of James Ruse Drive, but go due South near / under Kay Street, (which may need repositioning), and surface north of Clyburn station in the marshalling yards such that the bend in the line alignment is minimised from North of Rose Hill until through Auburn station.

My proposed Carlingford line alignment would sweep through via a 1200 m tunnel to join Rose Hill and Clyburn / Auburn stations, providing a Quick Freight / Commuter link without any tight turning arcs in this part of the network, totally freeing up Parramatta Road for road traffic, and greatly simplifying the existing Western line through connectivity.

<sup>11</sup> <http://www.moore.org.au/senh/2012/20120809%20Sydney%20Basin%20Freight%20Rail%20Link.pdf>

## ***Connect Parramatta to Rose Hill***

According to Fig 1<sup>12</sup> the Parramatta CBD will be the second biggest CBD apart from Sydney. Parramatta is very near the geographic centre of the Sydney Basin. The Western line connects the Parramatta CBD, but this CBD is “rail isolated” from Parramatta’s the Northern suburbs through and past Hornsby. The North Shore line is totally rail isolated from Parramatta. These commuter rail disconnects are the prime causes for associated commuter road congestion with cars and busses.



In this proposal the problem of connecting into Parramatta station is resolved by moving the current Rose Hill station about 600 m to the North and then splitting the tracks into three pairs as described in the above topics. This Northern Corridor feeder line can then connect with the Parramatta CBD from Rose Hill through a semi-circular tunnel to align with Parramatta station.

The picture above shows the existing Carlingford line on the right hand (Eastern) side and a proposed tunnel starting in the Rose Hill Station / Car Park with the tunnel running in as large an arc as possible to get well underground as it crosses James Ruse Drive, misses the larger building's foundations and maximise the turning radius.

This proposed rail link would provide direct connectivity for commuters to Parramatta from the Carlingford line. Because the radial arcs of this alignment are in the order of 800 m, most commuter trains should be able to travel at over 80 km/h for the nominal 2.4 km trip between the proposed newly located Rose Hill station and Parramatta station. This connecting trip should take about 2.5 minutes without changing trains.

As Parramatta is a major CBD in the Sydney basin, it would make sense to have this second level of railway tunnel below (and possibly offset from) the existing railway station and have the underground railway surface and join the Western line in the southern edge of Parramatta Park on the western side of Pitt Street.

<sup>12</sup> Sydney\_s\_Rail\_Future\_-\_high\_resolution.pdf <http://haveyoursay.nsw.gov.au/document/show/329>

With this rail option in place it becomes highly practical to run alternate trains from Hornsby to Parramatta and out to / through Blacktown, but before that is done the tunnel link from Carlingford to Pennant Hills needs to be complete.

### ***The Outer-North Loop***

The proposed tunnel connection from the Carlingford spur at Carlingford through to just south of Pennant Hills station will create an amazing increase in rail commuter traffic that will find this path much faster than using Pennant Hills Road and its associated spur arterial roads.

This proposed short rail tunnel changes the grossly under-utilised Carlingford spur into a major outer North Shore loop, by creating a direct connection between Lidcombe / Auburn / Parramatta and Hornsby without going anywhere near Epping. With Epping not involved it is then untangled from what would otherwise be a rather messy rail network.

This continuous high capacity loop would be **Hornsby – Normanhurst – Thornleigh – Pennant Hills – Carlingford – Telopea – Dundas – Rose Hill – Auburn – Lidcombe – Strathfield – Burwood – Redfern – Central – Town Hall – Wynyard – North Sydney – St Leonards – Chatswood – Gordon – Pymble – Turramurra – Hornsby.**

Currently the trains on the Carlingford line run at about 1 hour (60 minute) intervals, the trains on the upper North Shore run at about 15 minute intervals from Hornsby.

By running this “Outer Northern” loop at say 15 minute intervals then there is no change for most except that the Carlingford link is totally simplified and the train frequency is quadrupled. This high train service frequency would really encourage commuters to use this line as a very high preference to other modes of transport.

### ***The South-West Loop***

In the far south-west, about 1.7 km of partially overhead track is proposed to be added between Holsworthy and Casula, so that the East Hills line now joins with the South line towards the north forming part of a South-West loop for a number of frequent rail services covering the south-west of Sydney, the western line and the Bankstown line in a series of intersecting loops.

This continuous loop would go through: Liverpool - Cabramatta – Fairfield – Guildford Merrylands – Clyde - Lidcombe – Auburn – Flemington – Strathfield - Burwood – Croydon – Ashfield – Petersham – Lewisham – Redfern – Central – Town Hall – Wynyard – Circular Quay – Museum – Central – Redfern – Green Square – Mascot – Sydney Airport – Wolli Creek – Bardwell Park – Kingsgrove – Beverley Hills – Narwee - Riverwood – Padstow – Revesby – Panania - East Hills – Holsworthy - Casula – Liverpool.

In the total loop this are 38 stations that could be easily serviced every 10 minutes, irrespective of where the people are and where they want to go.

The current plan is a star network where trains would run between Campbelltown and Central, or Campbelltown and Liverpool to Cabramatta to Central.





My proposal is that west of Holsworthy, a 1.7 km branch to the southern line be included with overpasses at both junctions (so the lines do not get entangled as per Figure 2).

This connection would be a both-way link so that trains can continuously loop and/ or connect via Glenfield to Campbelltown as they do now.

**The effective continuous loop** is basically through Liverpool – Cabramatta – Fairfield – Guildford – Lidcombe – Burwood – Redfern – city loop – Redfern – Green Square – Sydney airport – East Hills – Liverpool.

With the 1.7 km track in place then **between Holsworthy station and Casula station**, the train track is now continuous and the services could run all day and night in both directions as follows: **Liverpool** - Cabramatta - Fairfield - Guildford - Lidcombe - Burwood - Redfern - city loop - Redfern - Green Square - Sydney Airport - Wooli Creek - Turrella - Bardwell park - East Hills - Bexley North - Kingsgrove - Beverley Hills - Narwee - Riverwood - Padstow - Revesby - Panania - East Hills - Holsworthy - Casula - **Liverpool**.

The split at Cabramatta would offer the (northern) choice of the Bankstown or Fairfield / Guildford lines in these inner loops too.

There is an accepted problem that having train service stop at every station is very time consuming and it is therefore proposed that a shuffle arrangement be organised so that every second or third train would stop at far less stations to fast-ferry passengers to the nearest major node and then swap for the home stop.

Then the relatively high speed and then low overhead cost continuous train loop would pick up the far south west of Sydney's suburbs.

### ***Double the South Line and East Hills Line Rails***

In line with this for anticipated far greater Freight and Commuter traffic on these rail lines, it is also proposed to double the tracks (from 2 to 4) from Campbelltown through to past Guildford to join with the proposed Sydney Basin Freight Link tunnel, starting just north of Guildford station and connecting through to Rose Hill then through past Hornsby into Sydney's Northern Freight Corridor.

With this link in place this provides a low overhead and highly practical method to make a large loop for the majority of trains along the East Hills line to connect with the South line via Liverpool.

With consideration of the map as in Fig 3, it is obvious that the East Hills Line needs to be doubled so that fast commuter trains can overtake the all stations commuter trains, and that Rail Freight can be carried straight through without interfering with the existing mainly Commuter rails on that line.

## **Single / Double Deck Trains in Sydney**

Until about 1968 all trains in Sydney were the “red rattlers” and all these were single deck trains.

My recollection is that double deck trains were brought in just before 1970 because the seating capacity on the single deck trains was simply not enough. The average transit time was typically well over 20 minutes, and people simply did not tolerate standing then and are far less tolerant of standing now!

Now, all trains in Sydney are double deck to accommodate the seating capacity. The thinking to go back to single deck working is rather confusing – in consideration that double deck busses are about to be brought into service again – to provide seating!

### ***The Occupational Health and Safety Debacle***

When the philosophy of Total Quality Management (TQM) came into Australia about 1985 / 1988, with the assistance from J Edwards Deming and several others. This philosophy changed the management style of many businesses to involve the floor staff and actually listen to what they were saying, instead of simply telling them what to do in a blast of one-way belittling / bullying of the staff by most supervisors and by management at most levels, especially by executive management and directors.

The outcome was that business productivity grew tremendously, because workers that actually knew what they were doing had the chance to get their managers on-side and be supportive of better and what would have become continuously improving work practices. The secondary outcome was that senior management became responsible for their staff practices (they were before, but that was legally ignored by the Courts).

This secondary outcome of documented management responsibility sent a shiver right up the management / executive / directors tree and they all looked for an out. The escape clause came in the form of ISO9001, which was Quality Documentation and Systems, where management then dropped TQM like a hot rock and en-masse adopted the ISO 9001 / 2 Quality Management Systems (QMS).

On the surface ISO 9002 looks to be a very good philosophy, where every process is written down and followed to the letter – and signed off by those doing the work.

What ISO 9002 really does is make the lowest level worker entirely responsible for the work being done, and freezes out continuous productivity improvement. This management driven “no changes” philosophy literally prevents any possibility for any continuous improvement process of any of the established methods and practices.

Continuous improvement cannot function where management certainty has locked down standard processes so that incremental improvements cannot be tolerated or even proposed.

The multi-level meetings at all interface levels are now extinct, and there are no Quality Circle working groups, as these “would stifle production”!

The tertiary outcome of the ISO 9002 Quality Management Systems is that because Executive Management sign off for the work practices and methods (something they usually have no conception of), then the signed off work practices have to ensure that nobody can get injured or killed while doing their work according to the signed off practices.

The flow-on from this situation is that all steps are taken by management to ensure that all workers have the correct Personal Protective Equipment (PPE). This situation has introduced a huge amount of red tape including the unnecessary use of labelling to state the obvious (Wet Floor, Doors Closing, etc.).

In trains this has gone further with windows not being able to be opened (for “safety” reasons) and now the apparent need for Air Conditioners in the rail cars to keep the passengers in comfort while travelling.

### ***Air Conditioning in Trains***

The “red rattlers” had no air conditioning apart from open windows and doors. As more of the double deck trains came in the windows were progressively given a limited and then nil air-flow from outside – making the necessity of fans and later air conditioning to keep the passengers comfortable while travelling.

With the debacle of the Occupational Health and Safety act spilling over from the ISO 9002 QMS debacle, larger and larger air conditioning units were specified for the passengers in these rail cars.

We now have the problem where we have air conditioning units that are so big that the power they draw and the weight of these units now heavily impacts on the ability of these trains to pull themselves up a relatively steep gradient!

The problem is that Sydney is a rather temperate climate and typically only 1 in about 50 days is really too cold or really too hot such that travelling in a somewhat opened vehicle is uncomfortable. So, what to do about air conditioning?

In practical terms, if the air-conditioning unit simply took the outside air and filtered it, then fan blew that through the carriage, then this would suffice for a good 80% of the time. For the other 20% of the time if the air-conditioning unit can keep the inside of the carriage cooler than 35 deg in a 40 deg day then that is ample for public transport. This rule of thumb should really limit the size of air conditioning to a very sensible temperate Australian limit.

### ***Gradient Too Steep***

As far as I understand, there was an argument against putting the rail service from Chatswood to Macquarie Park via a relatively short rail bridge through a small part of the Lane Cove National Park.

Consequently, the far less practical option was to tunnel well under the Lane Cove River and consequently, the much steeper gradient required a loop in the tunnel under Roseville suburb to get the rail track length long enough to try to minimise this very steep gradient.

So instead of engineering sense prevailing, the re-structured rail tunnel went well under the Lane Cove River instead of a bridge over the river, causing a dramatic increase in the original planned gradient. Then problems surfaced about the rail tracks moving on their moorings in the sleepers because of the "extra" weight of the trains and the gradient involved.

To further complicate matters it was discovered that the voltage drop on the overhead lines was too much (and this was a general problem) - usually being caused by the inclusion of large air conditioning plants (the "extra weight") on these newer trains to cover for the 1 in 50 days when the weather is "too hot" or "too cold".

Instead of more common engineering sense prevailing, I now understand that the newer trains have even larger air conditioning plants drawing even more current and making the trains far more inefficient than they need be. In my opinion if the air conditioning plants were reduced to a minimum then most of the new train provisioning problems would be totally eliminated.

So, I am guessing that the overhead wires have been doubled in most lines - primarily to account for unnecessary large air conditioning plants on these newer and yet to be released cars.

Now it seems that the air conditioning plants on the newer rail cars is so large and so heavy that it is now impractical to have the extra load of paying customers on the train cars themselves - so the cars have to be cut back to single deck working!

Minimise the size of the air conditioning plants - and leave space for the paying customers to sit down on double deck trains!

### ***Macquarie Park Tunnel a Botched Project?***

If my recollection is correct, the Glenbrook tunnel was found to be slightly too small for inter-urban double deck working trains and that tunnel had to be totally drilled out over some months so that a double deck - inter-urban train could then safely pass through.

My very big fear is that the tunnelling equipment for the planned North/West Tunnel will be specifically made for single deck working and consequently this tunnel will be just too small for double deck working trains.

**Please ensure that the tunnel measurements are sufficiently large that any of the double deck train cars can pass through without any safety issue – and do not get near to being jammed on the walls or ceiling??**

*My educated guess that the Macquarie Park tunnel was totally botched, then now is the time to re-consider its future and work out just how much it is really going to cost us in making the mistake in continuing with the flawed strategy of single deck working trains to appease this botch up - and re-design the path of this track as a bridge over a small part of the Lane Cove National Park - put the bridge into reality and stop pussy-footing around. Single deck trains promulgate the error and fail passengers.*