Submission to the

NSW Transport and Roads

on the

Long Term Transport Master Plan
September 2012

By

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Parliamentary Secretary for Transport and Roads
The Hon John Ajaka MLC

Thank you for the opportunity to provide feedback into the Draft Long Term Transport Master Plan 2012

This is my fourth and final input to improving this draft plan and in this submission I have focussed on Section 8, which fundamentally looks outside the Sydney Basin. The main issue is that much of the transport problems in the statewide scenario originate from unsatisfactory transport situations in the Sydney Basin.

My first submission produced a strategy to connect Campbelltown / Liverpool with Hornsby by an almost straight dual rail route so that rail traffic could pass through the Sydney Basin North / South in less than 30 minutes. This strategy has the capacity to remove a high percentage of road freight from the eastern coast (Pacific / Hume highways), making these roads much safer, and considerably reducing wear and tear on these and associated minor and arterial roads.

The second submission provided a strategy to properly connect Port Botany Freight Terminal with a solid dual rail overpass that would then directly connect with the East Hills Line for the southern corridor, the Illawarra line for the South Coast corridor and indirectly to the Northern corridor through the previously proposed Sydney Basin link, joining at Rosehill. This strategy should remove a large proportion of road freight vehicles from the M5 and Hume Highway, and the Pacific Highway.

The third submission recognised that Parramatta will be a major CBD and that commuter rail connectivity is an imperative. In this process, the realisation came that the level crossing at Parramatta was another major impediment and that from Rosehill another pair of tunnels would be necessary to connect Parramatta station and connect the Northern corridor with Port Botany. This strategy would optimise the use of the northern rail corridor from Port Botany, and provide a powerful rail commuter infrastructure north of Parramatta through to Hornsby.

This fourth submission looked outside Sydney with a view to minimising the overall investments in transport infrastructure, yet maximise the transport capability for a most economic outcome. The big realisation was that NSW uses an antiquated 1.5 kV DC electric reticulation system, and internationally the world standard is 25 kV AC.

Fast train technology requires 25 kV AC and NSW needs fast trains, and an international airport outside the Sydney Basin. NSW also desperately needs to minimise the road spend and this is minimised by re-introducing rail for heavy freight transport, particularly between the major shipping ports and the proposed freight interchange locations.

The initiatives proposed in this submission will go a long way to realising a dramatic improvement in both freight and commuter transport over the next 10 to 20 years, and bring NSW in line with the rest of the developed world, connected to Canberra with a fast train technology, and a highly functional International Airport and Freight exchange at Goulburn.

Please do not hesitate to contact me for further information.

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Overview of the Long Term Plan

Common Industrial Knowledge

My background since about 1965 is in telecommunications engineering. In that time I have worked in a wide range of roles within the telecommunications industry and have been involved with developing and managing the roll-out several long, medium and short-term plans.

The telecommunications industry has very big parallels with transport, fundamentally because telecommunications is the transport of electronic messages, be they by telegrams, telephones, radio and TV broadcasting, texting, website hosting, data storage and data transmission / reception on an end-to-end basis, locally, state-based, country-based and internationally.

Physical transport of people as commuters and/or touring, and/or the transport of packages, containers and bulk materials draws on extremely close engineering parallels. From that aspect alone, the cross transfer of my knowledge and wisdom about this Draft Plan should be taken seriously.

Basic Missing Information

Having read through the so called NSW Long Term Transport Master Plan I was rather disappointed to not be able to find any coordinated timetable of planned developments in the next five years, plans for the next 10 years and any 20-year goals.

Each section has its own goals, but these goals are not integrated into one time chart to show how these goals will interact with one another, and further, the so-called planning assumes that what was done in the past will continue in the future – just with more volume. This is not a strategic Plan.

What I did find was a host of rather meaningless motherhood statements that tell the readers of this Plan what the various elements of the physical Transport infrastructure are. These statements reflect very poorly on those that wrote this document because of the high number of simplistic inaccuracies (like the map on state transport corridors) and the serious lack of detail.

In Business, these motherhood statements and the associated paragraphs of meaningless wording is called “waffle” and I found it exceedingly disappointing that well over 300 pages of substantial waffle has been produced that in reality carries an exceedingly small amount of material that is of any forward planing use.

If this waffle were to be removed then this “Master Plan” document would come down to about 50 pages at the most, and that document would refer to several studies in a priority order such that there would be a clear path as to what will be funded, where it will be located and how this new infrastructure will build the business economy for NSW in the future.

When historical data is tabled in this document it remains – unfortunately – historical, as there are barely any projections apart from the CBD growths, and even then those projections were done in the consideration that nothing was to be done to change the status quo.

A classical example of total lack of planned direction is the stagnant pollution figures in 8.3.4. I will briefly cover this graph later and provide an innovative strategy to minimise this constant level of exhaust pollution while considerably increasing the transport throughput capability.

It seems to me that those in the so-called planning area, or those called in to create this so called “Master Plan” are highly conservative types that are waiting for an external push to move them into a new reality; or they know very little about the transport infrastructure itself and the limit extend of their knowledge is shown here.

I certainly hope that this ignorance is not the case, but the written word in this “Master Plan” seems to demonstrate a serious lack of transport industry knowledge beyond putting everything on the roads and making the roads the answer; when in fact the roads are the main problem, the biggest budget item, the most dangerous, the most polluting, the most congested and by far the most expensive infrastructure component to maintain.

Awkward Department Naming

Viewed from an outside the inner workings of the New South Wales (NSW) Government, it seems to me to be very strange to have a "Department of Transport and Roads", when "Roads" is one of the transport mediums.

It seems that the emphasis on "Roads" is no mistake and that by putting the heavy emphasis on "Roads" it reflects poorly on the department: even if road expenditure in building and maintenance of these roads is a very big-ticket item.

Looking at this rather awkward Departmental naming, it sounds to me as though it is a compensation of the past where one or more earlier State Departments were merged for business efficiency reasons. Probably the biggest earlier department in the multi-merger was the "Department of Roads", but they are too obstinate to realise that the synergy in merging the various transport modes into a common business unit was done so that the efficiencies of associated transport mediums can be maximised.

To me, it would make tremendous sense if the "Department of Transport and Roads" were renamed appropriately so that it becomes the "Department of Transport".

With this change of naming to reflect the prime focus of the Department into Transport, this may then be the synergetic move to cause a range of innovations that will reduce the overall high budgetary requirements on road maintenance and seriously look at alternative physical transport mechanisms that have a much lower overhead per quantum load. These strategies would in turn considerably reduce the budgetary requirement on road building and road maintenance and that has to be much better for NSW and Australia.

Why (Part) Privatisation Fails

We have already witnessed the stupidity of privatising the Rail Airport Link, which now results in comparison, extortionately expensive rail costs to and from the Sydney Airport. Commuter costs to rail stations nearby the Domestic and International Airport terminals is considerably cheaper.

This situation therefore really defines that when a Private operator gets involved with what is essentially an infrastructure, the pricing is radically changed to match the competitive business model (which is a ROI of 20% or greater).

For an Infrastructure Business, such as a Road, Rail, Airline or Ferry transport system, Telecommunications, Water supply etc; the standard ROI is specifically between 4% and 7% pa, and not any more.

The Department of Transport needs to realise that getting a private contractor in to build and manage an infrastructure is fundamentally flawed economics. Sure, get the large engineering contractors in to build the infrastructure, but that is where the "assistance" must stop.

Operating the infrastructure is the role of the State Governments and Federal Governments[1]. Unfortunately our Universities have had the Economics course contents hijacked by the US Industrialists for their own greed.

Making Roads Safer

In 8.4.1, there are several simple and effective methods to make roads much safer than they are now, and it does not take much effort.

Workplace Safety Laws

In the first case it has to be realised that road usage is largely transport, and being transport, then this must come in under the Workplace Safety laws, and not the Roads and Maritime Authority (RMA). *[One wonders at the inept naming of the RMA that excludes Rail and Air in the name, so that it could be the Roads, Marine, Rail, and Air Authority – RMRAA. More succinctly the name could simply be the Transport Authority – TA.]*

With this simple change the penalties for speeding would be increased by at least 10 times, so a first speeding offence would cost the driver say $5,000, the second $50,000 and five years no licence.

[1] http://www.moore.org.au/busn/02/Categories.htm

With this in place either of two outcomes will happen: the Workplace Safety laws, (which are the bane of Australia's internationally competitive industry) would be stripped of Red Tape and the penalties relaxed to align with the laws under the RMA (TA).

Alternatively, if the Workplace Safety laws were rightly extended to all Road transport vehicles, there would be a mass migration of transport onto Rail instead of Road, saving Australia an immense amount of International debit due to the vastly reduced carbon footprint caused by road freight.

Concrete Barriers on all Double Unbroken Lines

We already have double unbroken lines on many highways to tell the drivers to not cross over these lines. The usual consequence for crossing these lines is a head-on collision resulting in death of the occupants in the smaller vehicle.

We already know that manufacturing heavy-duty highway construction is exceedingly expensive and relatively high maintenance, particularly because roads are simply not engineered for heavy transport to travel at speed.

Because heavy-duty main Road manufacture is so expensive, and the fact that many of these roads already have double unbroken lines on them as the indication of severe danger in crossing over into incoming traffic, it makes perfect economic sense to position a long length concrete barrier all the way along these single carriage-ways so that drivers simply cannot cross onto the opposite side.

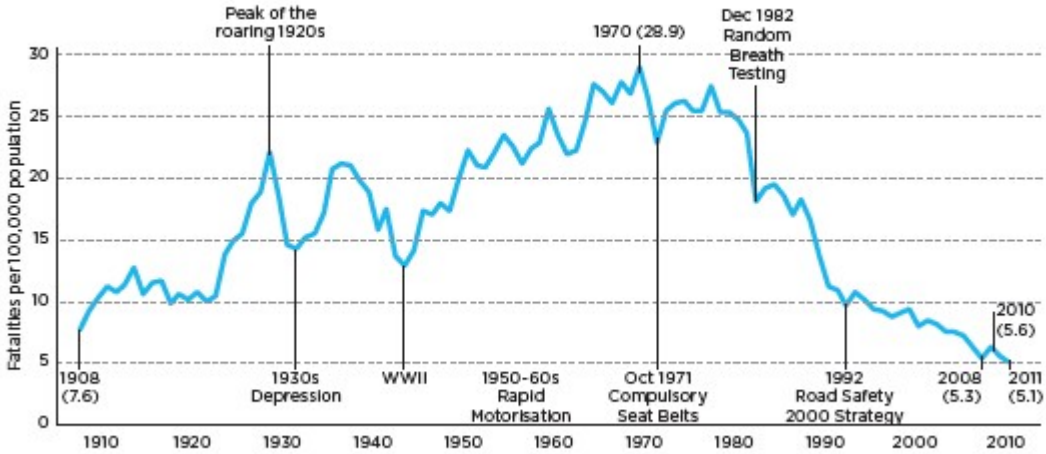
As the words "make roads safer" are in the long term strategy, then that motherhood statement needs to be followed up with definite actions in a short-term timeframe to actually make the difference that will make the roads actually safer – even if it means crippling the oil industry lobby of its profits by putting freight on trains, putting in concrete barriers all the way along narrow main roads, substantially reducing the speeds to under 80 km/h for many main roads, and immediately introducing severe penalties that are in line with Workplace Safety laws.

Making Travel Safer

Most of the points raised in Section 8.2 are moot – that is they are either meaningless motherhood statements that sound good and are entirely fuzzy, and/or these statements are insulting to read as it demonstrates the incompetence of those that produced this strategy.

The chart shown in Figure 8.3 is interesting in that it shows an exponential decrease in population deaths per 100,000 with time from about 1980 until the present time.

Figure 8.3 Road traffic crash fatalities per 100,000 population, NSW, 1908-2011



Since Ralph Nader[2] stepped into the USA manufacturing industry in 1965 and caused massive safety improvements, and Australia's (NSW / Lindfield) own Arthur E Bishop[3] in 1971 introduced Variable

[2] http://en.wikipedia.org/wiki/Ralph_Nader
[3] http://www.google.com/patents/US3753378

Ratio Steering to really make steering considerably safer. As more and more vehicles used this variable ration steering the number of steering-caused collisions have dramatically reduced.

The roads have not significantly changed and "become safer" – quite the contrary. Freeways are now prevalent so that drivers get a false sense of security and drive faster, and fall asleep at the wheel after the "sugar hit" wears out, usually about two to three hours into a journey, then run off the road, or into oncoming traffic, occasionally causing a fatality.

Now that new vehicles have air bags in them that instantly fill when the vehicle is in a collision, we have even less fatalities per number of collisions, and drive even faster in a false sense of security.

What this chart really fails to show is the number of minor collisions, the number of major collisions and the number of fatal collisions over the same timeline. It is common knowledge in occupation, health and safety (OH&S) that for every fatality, there are about 30 paralysing injuries (where it may have been far cheaper to let the person die), about 300 injuries that require some considerable time in hospital and/or repatriation, about 3,000 injuries that can be managed by first aid, about 30,000 minor collisions where panels may be dented and about 300,000 "near-hits", where collisions are avoided but the drivers and passengers are mentally and/or physically harmed.

The problem with increasing road safety is that this means reducing the commuting speed so that incidents result in fewer fatalities. The converse situation with road safety is that the more safe cars are made, the faster people will drive them to maintain the same injury risk factor.

Proof of this is to simply watch a racing car race and see how the drivers are all strapped in with all the protection – so they drive very fast and are in as much danger as others in standard cars with a range of protective devices driving just over the speed limit. People feel safer with air bags – so they drive faster – fact!

Section 8.2.2 totally fails to recognise that Rail transport is at least 400 times (40,000%) safer than road transport. Now, considering the synergetic costs of hospital care is a huge budget item for NSW, it beggars belief that this Master Plan totally misses out on providing commuter Rail services as a very high priority. This situation does however show that funds created from Roads, are well justified in being invested back into Hospitals.

The Part Solution of Electrical Vehicles

The introduction of Section 8 mentions the mapping of electrical vehicles – presumably for recharging purposes. This (again motherhood) statement is not followed up anywhere in the section – so there really is no plan beyond this.

When we drive vehicles most of us drive in the metropolitan areas and encounter about 35 to 60 km in a one-way trip from home to work. So the return trip is about 70 to 120 km, meaning that for electrical vehicles, we do not need to charge our batteries anywhere else but from home – and then on the low non-peak rate. So in most metropolitan areas, and town situations, we really don't need any electric vehicle charging points away from home!

Because of the panic that people have about running out of energy as the typical range of a battery powered electric car is typically between 80 km and 120 km, the manufacturers have winced on putting in a double load of batteries to give a range of say 160 to 240 km but instead have opted for a petrol fuelled ICE as a "backup" and called it a "Hybrid"!

Thinking a little more laterally, and thinking hybrid engine vehicles: if you pick the typical General Motors Volt[4] sedan, it has a 1400 cc 4-stroke engine in it, much the same as the Toyota Prius and much the same as the Toyota Camray hybrid vehicles. So, not only do these vehicles have a large Internal Combustion Engine (ICE) in them, they also have Li_2PO_4 based-batteries, and a large Generator / Alternator / Motor in there plus all the controls, so space if tight and they are heavy.

Thinking a little more laterally; what if the ICE was only 800 cc and a V-Twin with almost no moving parts? This would make the electric / ICE hybrid vehicle far more realistic – if only this ICE had the same power.

[4] http://gm-volt.com/about/

As it happens, the CITS[5] engine is being developed in Sydney, NSW; and compared to a typical 1400 cc (100 kW) ICE, this amazing ICE development will weigh less than half, the power will be the same, the fuel efficiency will be the same, the parts will be far less, the running will be very smooth, and the manufacturing costs will be substantially less.

With this engine as the ICE component in a hybrid vehicle, there will be no reason for an Electrical Vehicle Roads Map!

This amazing motor, which needs about $5 M to make it past the prototype stage, would firmly sit Sydney (NSW) as the technological breakthrough city for Hybrid cars for the next 50 years on the global map! Put in another vein, because of the low pollution of this engine and with it working in an electric hybrid structure the stagnant pollution figures shown in figure 8.5 could be seriously mitigated while keeping a steady growth in urban (Sydney) road transport.

Serious Flaws in Reducing Emissions

Section 8.3.3 is, I believe to be very seriously flawed. The Cold Start VOC (Volatile Organic Compound) emissions have a 7 second time allowance from initial turn–on of an engine, and after that time period, the catalyst is hot enough to control the VOC emissions. Therefore, after that 7-second time lapse, the vehicle emissions must be within the specified VOC emissions limit.

In other words, say a vehicle is being driven for 5 minutes (300 seconds) in a short trip, then the VOC emissions will be outside specification for only 1.6% of that total time, not 54% as stipulated in this Master Plan. Put another way, the 54% figure is about 32 times (3,200%) greater than reality.

Most personal and works vehicles are driven for about 45 minutes (2700 seconds) to and from work / home, so this relates to about 0.26% VOC emissions outside specifications. In this case the 54% figure is about 208 times (20,800%) greater than reality

Considering fleet freight road transport being driven between say Albury and Sydney, 546 km about 5 hours and 48 minutes, (20880 seconds) for the trip. In this case about 0.035% of the total time is outside the VOC emissions specifications, not 39% as stipulated in the Master Plan. This is a yawning disparity between fact 0.035% and the figure 39% as provided in the Master Plan. This figure is about 1114 times (111,428%) greater than reality.

Looking at this problem another way, we have serious VOC emissions pollution in the M5 tunnel primarily caused by the high percentage of road freight vehicles using that path towards the southern Sydney Corridor. If these vehicles were within the VOCC emissions standards then there should not be a pollution problem – but there is!

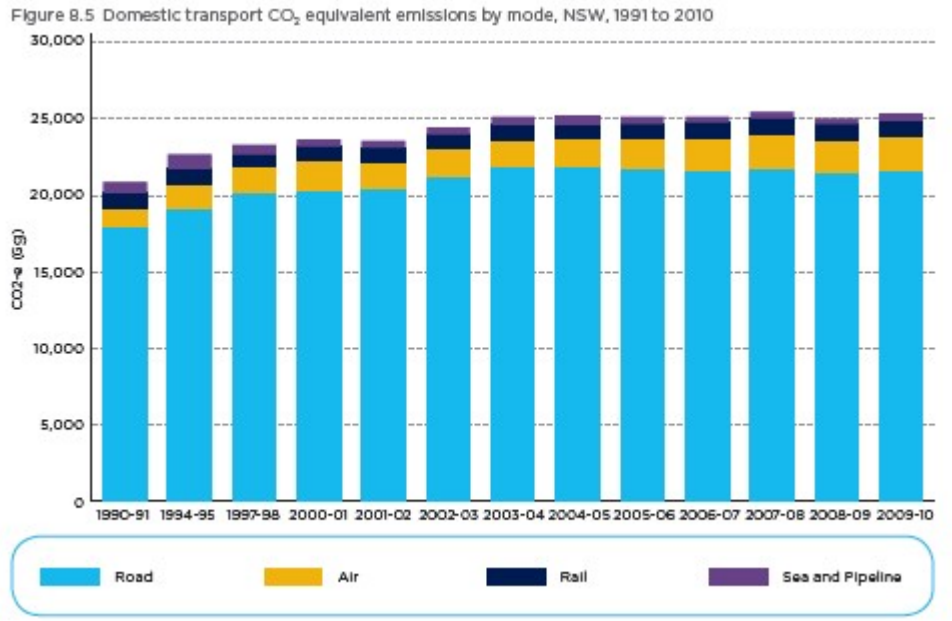
So this means that the large percentage of all road freight vehicles are well outside the VOC emissions standards and therefore should be immediately removed from the road until these problems are corrected.

[5] http://citsengine.webs.com/

Taking Action on Unnecessary Emissions

In section 8.3.4 there is a golden opportunity here to reduce carbon-based emissions by using transport mediums that simply produce far less emissions per gross transport transfer.

The graph in figure 8.5, shown here is very interesting for special reasons



This chart fundamentally shows that from about 2003/2004, the concentration of CO2 wherever this was being measured has stabilised with about 85% being caused by road traffic, about 10% being caused by air traffic, and about 5% being caused by rail traffic.

In this same time bracket, the number of road freight vehicles has also stabilised and the number of cars has slightly increased, but these cars are generally smaller. It is this reason why the pollution figures are considerably consistent from about 2003 onwards.

Diesel-engined road freight transport vehicles cause most of the road-based pollution.

With reference to my earlier submission[6] (pages 11-16), my calculations show that Road Freight for an equivalent wholesale / large load uses at least 400% more fuel than that used by Rail Transport over an equivalent distance in Australia.

So, it beggars belief that the long term Transport Plan for NSW would even contemplate using long-haul Road Freight in its Strategy – unless those on the decision committee have been seriously compromised by those in the oil companies, keen to do anything to continue high volume oil sales.

It is very obvious to me that if the long-haul road freight were to be removed and replaced by rail freight, then the 22,000 unit figure could very quickly be cut by about 75% to about 5500, leaving a total pollution of about 10000 units, a reduction in pollution of about 54%, or about 45% of what is there now.

These facts may be a bit hard for the road freight fraternity and oil industry lobby (OIL) to swallow.

Looking at this situation another way; the remaining 54% amounts to about 12000 units of pollution, meaning that if diesel trains were used (and these are at least 400% more efficient than diesel road freight vehicles per large quantum load), then rail freight would move at least 400% more fuel efficient with freight than via roads for the same pollution – if the train engines are using diesel fuelled trains.

[6] http://www.moore.org.au/senh/2010/National%20Freight%20Network%20Plan.pdf

If these train engines were electricity powered then the overall pollution would be far, far lower, and the amount of freight transported would be considerably more, with even less carbon pollution.

Figure 8.6 Historic emissions for NSW road transport, 1991 to 2010

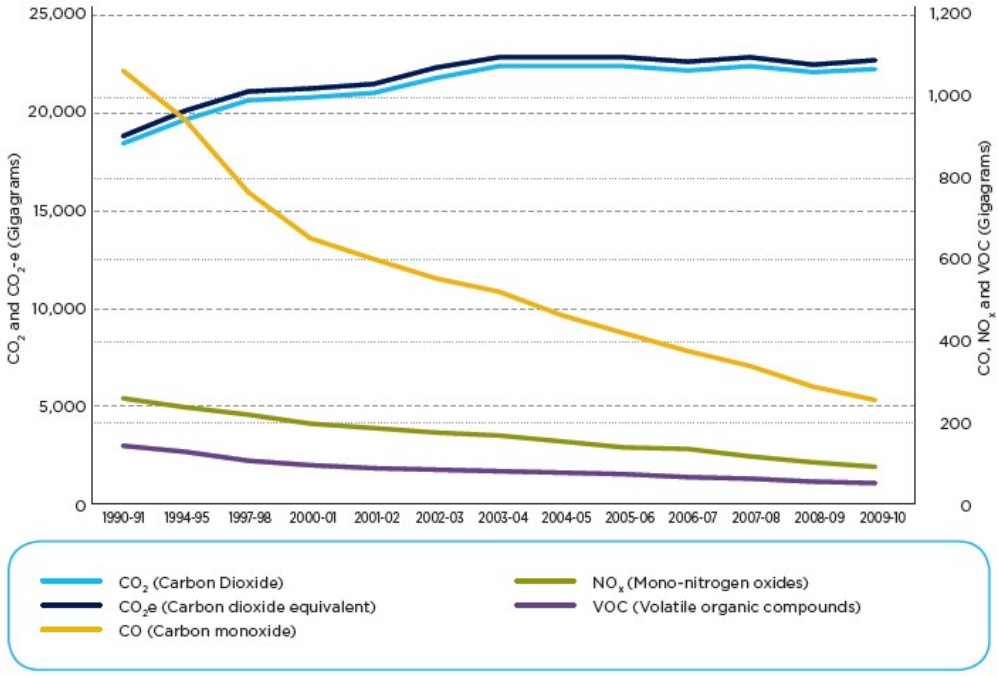


Figure 8.6 above shows the improvement in total emissions (of CO) as computer engine management is being progressively introduced with new vehicles. The other four lines are rather meaningless as they are substantially stable, and rather irrelevant.

Car manufacturers deliberately introduced computer based engine management for two reasons: more reliable engines and far more importantly so that backyard mechanics could not regularly service their own cars. This second reason was extremely important because it locks the vast majority of people into having their cars regularly maintenanced at the manufacturers own franchised maintenance garages, which in turn, steers these people to regularly re-purchase new cars from their franchised new car outlets as a closed loop system.

The prime reason why General motors deliberately rented their first round of electrical vehicles (the EV1) in the USA was because they rightly feared that the maintenance would be absolutely minimum, and it was. Hence GM had all the vehicles returned and crushed them.[7]

Using Technology To Modernise Transport

This motherhood statement is a doozie! We are already using new technology to the best of our ability but modernising transport really comes from having a reasonable budget that continually takes out the worst performing public transport equipment and replaced that with new equipment that will have a much lower ongoing maintenance bill

In that maintenance bill – that also includes customer comfort, because simply, if the customers are not comfortable in transit, then they will resort to private transport.

This statement does not mean that every public vehicle must be air-conditioned, but it does mean that the suspension must be working properly, the seats are comfortable to sit in and the cars are not filled with graffiti.

Maintaining Transport Infrastructure

This area of the Master Plan is particularly interesting in that it is focussed on maintaining the Roads, and when it comes to repairing disaster roads this is shown to cost a total of about $108 M in the last three years. This is a very small price to pay.

[7] http://en.wikipedia.org/wiki/Who_Killed_the_Electric_Car%3F

The cost break-up for various roads shown in the bottom right of page 293 is also interesting in that local roads (about $113M) really accounts for the vast majority of costs, and I am sure that all the local councils are really struggling to keep their roads in a workable condition.

Keeping our Roads in Good Condition

The problem shown here in 8.4.1 is that several years ago, some idiot leading the NSW State Government decided to remove a large amount of rail infrastructure that was used to carry heavy freight from the farms. At the time of making this call the real problem was that the sleepers had gone beyond their useful life and they could no longer support the rails above them, making it a very dangerous situation for freight rail transport.

At that time this idiot State Government leader had the technology (of pre-stressed concrete sleepers) at hand but instead of building several industries well outside of Sydney / Newcastle / Wollongong, this Government proceeded in closing down as many rail tracks as possible to minimise the problem in the short-term, and really maximise the road damage for the future (which is now).

Un-surprisingly, this Long Term Transport Plan is myopically focussed on budgeting for short-term road costs and totally misses out on a long-term plan to re-establish the country freight rail network, which would immediately have the effect of really reducing damage on these roads, concurrently minimise the carbon-based pollution, and significantly reduce road congestion.

So, with a budget of about $1.2 Bn for the roads, virtually nothing is put into minimising the load on the roads by thinking laterally and transferring the freight across onto Rail.

With time, as a significant portion of the road freight is transferred back to rail freight, the damage on the roads will significantly reduce, concurrently resulting in a significant reduction in road / bridge maintenance costs.

Thinking about this strategically instead of simply increasing road capacity, is to deliberately put in rail connectivity so that the adjacent roads are not damaged. Rail infrastructure is properly engineered for heavy transport and is considerably cheaper to install and maintain when it comes to heavy loads.

Fix the Rail Access with Port Botany

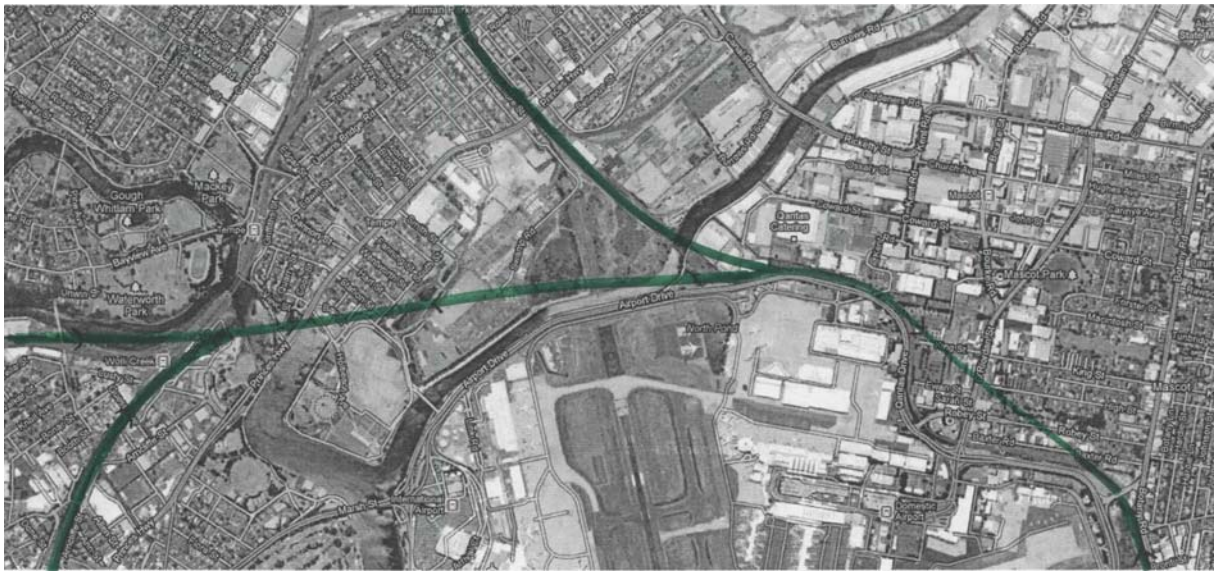
The main problem with congested and polluted roads starts in Port Botany, where it is land-locked so badly that a single tight-curved freight rail connection frankly will not allow freight to be efficiently transferred to or from that port to anywhere except by Road Freight transport, and even that mode of freight transport is rather inefficient and highly polluting.

The direct consequence of this situation is that road freight trucks heavily congest the M5 East tunnel, the M5, and the Hume highway to the south, and congest Pennant Hills road and the F3 motorway to the north of the Sydney Basin.

Instead, by addressing the cause of the problem by providing a fast dual rail access to and from Port Botany, the far shorter-term strategy addresses fixing the symptom of the problem by widening the M5. This, like before, will be successful for a few years before it too becomes totally congested as the Sydney suburbs continue to sprawl southwards of Parramatta – Penrith.

Some weeks ago I briefly appraised the situation and realised that a dual rail overpass of south Mascot would connect to the East Hills line (to connect into the Southern corridor), the Illawarra line, (to connect into the South Coast line) and provide connectivity towards the Sydney Basin Northern Corridor.

I there put it that a very high priority infrastructure build is the provision of a dual path rail bridge from the Port Botany area to pass over south Mascot and connect into the existing rail leading to Marrickville. Further that the dual lines be continued as a rail bridge from north of the airport connecting to the East Hills Line at Wolli Creek, and branching south via Arncliffe station to connect into the Illawarra line.



This picture (thanks to Google) shows how a south Mascot overpass bridge would directly connect Port Botany and give it the quick freight rail connectivity that it desperately requires. Currently a rail line exists from near the north end of the Airport heading northwest towards Marrickville. My proposal includes a branch west to Wolli Creek to join into the East Hills line, and an early branch of that, southwards near Arncliffe station joining into the Illawarra line.

Such a simple piece of rail infrastructure would remove a good 80% of all road freight to and from Port Botany, and provide the connectivity that Port Botany requires for the now and long-term future. A brief document[8] on this topic was sent to the Master Plan Team.

The short-term spin-off by putting a quick freight rail connectivity into the Port Botany Freight Terminal is that progressively the road damage caused by heavy road freight vehicles will be substantially reduced all over NSW and that flow-on effect will be that the roads will be able to be maintenanced to a higher standard, greatly improving the Road User Satisfaction ratings as shown in Figure 8.15.

Convert our Electrified Rail System to 25 kV

In the USA the domestic power is 110 V at 60 Hz, while almost universally elsewhere in the world the standard is 230 V 50 Hz. The big advantage of using 230 V instead of 110 V is that it is much cheaper to wire the 230 V infrastructure, because far less distribution transformers are required for the same number of premises.

Losing 20 V in the distribution wiring in a 230 V reticulation amounts to about 91%, but losing 20 V in a 110 V reticulation amounts to 81%, so at least four times as many power transformers are required: else the reticulation wiring has to be exceedingly thick and either way the lower voltage reticulation is a very expensive option compared to the higher voltage reticulation used almost universally.

In NSW as far as I know the train reticulation system is based on 1.5 kV DC overhead.

With the debacle of having a very steep incline from Chatswood to Macquarie Park – under the Lane Cove River (which I believe was a totally botched project), and having horrendously large air conditioning plants in rail cars for the once in 100 days when transport is slightly uncomfortable; a more recent decision was to literally double the overhead wiring to ensure that the voltage drop to the trains is low enough so that the trains will not stall on inclines.

Thinking laterally, and for low pollution, it would make a lot of sense to run the trains on AC – not DC, and run the overhead voltage far higher, so the current is far lower, and the voltage drops to the trains is far less an issue, and the power connecting points are spaced out far more than they are now.

The reason to choose AC is that with alternating current (AC) we now have solid-state switches called TRIACs that can be phase controlled such that only part of the AC needs be switched in – and the control is rather small and comparative to DC this control is very inexpensive.

[8] http://www.moore.org.au/senh/2012/20120910%20Connecting%20Port%20Botany.pdf

The reason to choose a much higher voltage is that about 1 MW is required to move a train, so with a 1500 V DC feed, about 700 amperes is required to be passed through the transformers, rectifiers, overhead wires and rail, through the pantograph connection and into the speed controller before passing into the electrical motor.

The international standard for rail voltage is 25 kV AC, so not only would the components be readily available from multiple sources in the developed world, but these would be very inexpensive.

NSW needs to factor in a change of rail infrastructure such that the trains will move to 25 kV AC within the next five years. At least then NSW will be able to be in step with the rest of the developed world and expand the rail services for both commuter and freight at very little future expense.

Assume the current spacing for 1.5 kV DC mains feeder points is say 4 km, (losing say 10% in the overhead wiring) then for the equivalent 25 kV AC mains feeder points could be spaced out at about 65 km, greatly minimising the number of mains feeder points, greatly improving the reliability and this would pave the way for electrification of main non-urban routes, and fast rail transport.

Because the rail voltage is then in alignment with world standards, the cost of rail motors and control equipment will be substantially less than it is now, and in the longer term there will be very significant savings, enabling the regular and consistent upgrading of Rail infrastructure assets.

Regularly Replace and Upgrade Rail Infrastructure

In section 8.4.2; in the past 30 years there have been some dramatic advances in Computer Assisted Design (CAD), not just in mapping but also in engineering of rail cars, rolling stock, bogies and rail engineering.

Apart from the coal transport business most of the freight rolling stock in NSW has been left to rot and rust from about the same time as the rail spurs were de-commissioned and deserted.

This situation brings with it an excellent opportunity for NSW to collaborate with other states in Australia and choose standard bogies, cars and engine technologies best suited for freight transport that will be capable of speeds of over 150 km/h and preferably over 220 km/h.

My reasoning for this is that as common sense prevails; efficient, low pollution, quick rail freight transport in Australia will become the normal within a few years to replace road freight transport particularly for long haul freight carriage. With good aerodynamics a freight train should be able to travel at well over 150 km/h for most of the non-urban component and at about 100 km/h in the metro area. For this to happen some of the existing rail assets will have to be restructured.

Queensland Railways have some of the most advanced Rail engineering facilities in the world. Not only is Queensland in Australia, but it is also in an adjacent State, and we have a high degree of commerce / freight transported between Queensland and NSW.

Connect Rail Freight Liverpool to Hornsby

A classic example is that practically, there is no way that a freight train can traverse the Sydney Basin from Liverpool to Hornsby in less than about 120 minutes, and even then the train may need to be broken up and made into several small trains to handle the very tight bends near Auburn, Strathfield, Cheltenham, Beecroft, Waverton and several other locations.

Considering business in country NSW: At a minerals symposium that I attended in mid 2012, one of the presenters spoke of mining good bauxite deposits near Goulburn. Their opportunity was to transport this ore to an electric smelter, and the two choices were Gladstone in Queensland, or to China where there are 17 smelters.

We were informed that it is considerably cheaper to transport the bauxite from near Goulburn to Port Kembla to China than it is to transport the bauxite to from near Goulburn to Port Kembla, to Gladstone by ship and then be rail to the Gladstone smelter in Queensland. The labour costs of double handling at / near Gladstone makes the freight process non-competitive, so the first choice is to export the raw material to China and lose out on the high profits of selling pure aluminium ingots.

Looking at this in a synergetic view: If there was a quick rail connectivity in the Sydney Basin from Liverpool to Hornsby, then the bauxite could be transported directly from near Goulburn through the Sydney Basin non-stop past Newcastle to Gladstone with a single handling.

Similarly road freight destined for northern NSW, Brisbane, Queensland, etc. could be directly passed through Sydney on the rail network without double handling and much faster than on the roads, and with far less road damage to the Pacific Highway, and far safer for the remaining road traffic.

Some weeks ago I was disturbed by the high number of road freight vehicles on the road between Yass and Sydney, which lead me to consider why all this freight is being transported by road. One obvious cause was the land-locked Port Botany freight terminal, but on travelling on the M7 and M2 then up past Thornleigh on Pennant Hills Road, it was obviously a northern problem too. These freight trucks were travelling through Sydney, and not stopping!

A relatively quick investigation of this situation showed me that it would be rather easy to position two nominally 4 km tunnels and join some rather underutilised existing rail infrastructure to directly connect Liverpool to Hornsby such that a quick rail freight train could traverse this nominal 37 km span in about 22 minutes. A short document[9] on this subject was recently forwarded to the Master Plan Team

The connection between Liverpool and Hornsby is almost straight for most of the way, and there are no tight bends anywhere that would severely restrict the speed of the traversing trains. The overview of the proposed rail path across the Sydney Basin is shown above.

9 http://www.moore.org.au/senh/2012/20120809%20Sydney%20Basin%20Freight%20Rail%20Link.pdf

Sydney's Geographic Centre has Moved

In the 1940s, the "Western Suburbs" of Sydney was literally at Strathfield, as this is where the Western Suburbs Rugby League Football Club was originally situated. The geographic centre was the Sydney CBD and all rail services (including trams) were focussed on servicing the Sydney CBD as the main priority.

Since the 1970s, suburbs have developed that have joined Blacktown to Penrith and laterally by about 1990, the geographic centre of Sydney was Parramatta. Since the 1980s developing suburbs have joined Liverpool to Parramatta, and more recently developing suburbs are joining Parramatta towards Windsor. So, practically, Parramatta is still roughly the centre of the Sydney Basin of sprawling suburbs.

Chapter 7 in the NSW Long Term Transport Master Plan is still stuck on the thinking that Sydney CBD will remain being the huge business focus point. To all intents and purposes, it would make tremendous practical sense to reposition the main CBD to align with the geographic CBD. By moving the business centre of the Sydney basin to the geographic centre the cost and time in transport would be minimised.

Very soon after realising that a couple of relatively short almost co-linear tunnels as outlined above and a brief document[10] was recently sent to the Master Plan Team. These two tunnels would radically change and simplify the whole east coast road congestion; it also became obvious to me that there is a folly of keeping the Sydney CBD as the main CBD in the Sydney basin.

The picture above shows how and where a third tunnel from the present Rosehill station site could connect under Parramatta station and open this entire area as a very large CBD.

The picture on the left shows how and where a rail tunnel could efficiently connect Rosehill station towards Guildford on the main South link, and connect towards Strathfield on the Western Link.

Further, with advances in optical fibre based telecommunications all the way to business premises and to home premises, and the liberal use of Wi-Fi technologies to connect equipment in these premises, many businesses that were central office based can be re-configured to be distributed office based, and have far lower building overheads, and much less commuter travel.

With these and many other factors in mind, the next quantum leap as an opportunity to bring NSW to the fore is to physically move the rail core / centre towards Parramatta, and link the almost straight proposed North – South Sydney Basin line with the Western line.

Instead of blindly creating a super congestion point in/under Parramatta station, my proposal is to link Rosehill to Parramatta station and the Western Line with an arc shaped tunnel with a maximum radius, and also connect Rosehill towards Strathfield with yet another short tunnel that traverses under the M4 and under Parramatta Road (to eliminate the level crossing), and join just north of Clyburn

[10] http://www.moore.org.au/senh/2012/20120914%20Sydney%20Commuter%20Rail%20Missing%20Links.pdf

station. This strategy would take advantage of the opportunity to look ahead and plan well beyond the status quo of "no forward thinking".

Prepare Rail Infrastructure for High Speed

Page 279 of the Long Term Transport Plan actually mentions collaboration with other governments to assess options for high-speed rail for the east coast that will also support NSW's economic and population growth.

This paragraph has to be the motherhood copout statement of all time.

It has been more than 10 years since the Sydney – Canberra via Wollongong fast train service was killed off well before it started.

High speed rail services require 25 kV AC as the standard feeder, so it makes very common sense to plan and instigate the 25 kV rollout as the prime imperative, and with this getting into place, then a large range of opportunities will become both affordable and practical.

Treble the Rail Tracks on the East Hills Line

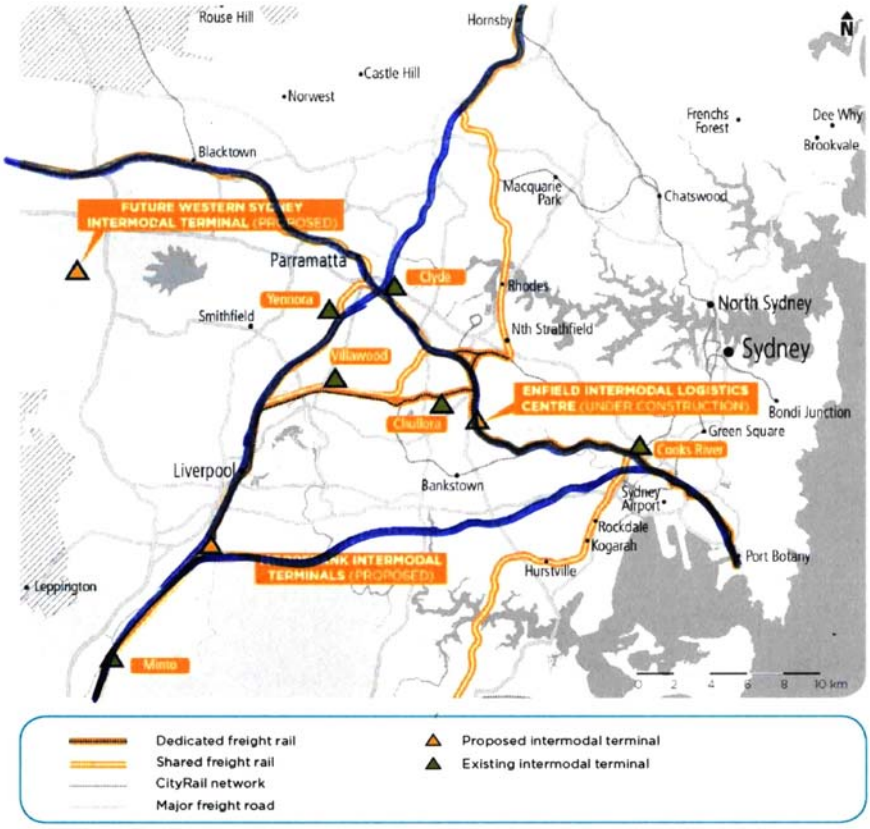
In chapter 7 in the Long Term Transport Master Plan, it identified that the East Hills line (Central – Wolli Creek – Campbelltown would be very heavily used.

There was nothing in this long term plan to consider trebling the tracks from about Wolli Creek to Campbelltown so that one set could pick up the local commuter traffic, the next set would pick up the Freight traffic (predominantly from Port Botany), and the third set of tracks would be as a high speed interconnect into the main south link (southern Sydney Basin corridor) to go towards Canberra.

Restructure the Rail Freight Paths Through Sydney Basin

With the tracks on the East Hills line doubled and structured as discussed in the reference document "Connecting Port Botany" then the Strathfield – Central centric rail system in the Sydney basin is no longer constricted by route network and switch-point congestion in this area, and the picture below shows that with these additions, together with the Liverpool – Hornsby straight through rail connection, the rail freight network becomes considerably less tangled.

Figure 7.2 The Sydney freight network, including intermodal terminals



This rail freight structure not only allows the rail freight to become an efficient mode of transport that has a very low carbon footprint in comparison to road freight, but this rail transport can be much quicker – even over a run as short as 100 km.

The opportunity created by this forward thinking strategy is that a fast commuter train could then use this same East Hills link to connect from Central and connect to Canberra. Considering that the distance is approximately 300 km in round figures, a fast commuter train averaging say 200 km/h would take about 1.5 hours for the through trip to Civic in Canberra.

Another opportunity is that with the through connection from Hornsby – Rosehill – Liverpool – Campbelltown then this path would pick up the Northern and Central Western suburbs as an alternat fast commuter train towards Canberra, again taking about 1.5 hours for the entire journey.

Connect High Speed Rail: Canberra – Goulburn – Sydney

For several decades many plans to develop a fast train between Melbourne and Sydney have come and gone. The proposal outlined here approaches this opportunity in a radically different manner, and leapfrogs on many of the more recent technologies together with a far better utilisation of the existing rail infrastructure to create a synergetic high-speed link between Canberra and Sydney. The flow-on from this proposal will be a network of high-speed rail links from Canberra to other centres including Melbourne and Adelaide.

The third opportunity is that freight rail can be carried on this same rail route towards Melbourne, and the first hop of the trip to Canberra would be about 1.5 hours as these trains should also travel at nominally 200 km/h because their total wind drag per quantum load is infinitesimal compared to the wind drag caused by say 100 road freight vehicles, even if these road freight vehicles travelled much slower (eg 80 km/h).

Thinking laterally not only is the carbon pollution footprint dramatically reduced, but the roads are made far safer as the large majority of long distance transport vehicles are then removed from the Sydney Basin, and removed from a large percentage of the NSW roads – which in turn dramatically reduces the roads maintenance bill in the long term future, and dramatically reduces Australia's dependence on diesel fuel (apart from the mining industry, which are very heavy users of diesel fuel).

To understand the problem of diesel fuel pollution all that is needed is a few days in the mid-Hunter Valley coal mining area to realise that the red-brown haze is actually diesel exhaust and coal dust.

Position an International Airport at Goulburn

The fourth opportunity is to position the NSW International airport at Goulburn, right out of the Sydney Basin, and only about 1 hour from Sydney by fast train, and only 30 minutes from Canberra by fast train. Goulburn is close to Wollongong, which uses Albion Park as the local airport and Sydney as the International Airport.

Why Goulburn? This centre creates an opportunity to open up and connect with the South Coast, and connect as far as Griffith, cutting off hours of extra road transport into Sydney Airport.

Goulburn already has a local airport about 4 km south of the current highway bypass and this airport can be readily expanded to take international transport on a 24 / 7 basis where in Sydney Airport, the time curfew limits traffic to between 6 am and 10 pm.

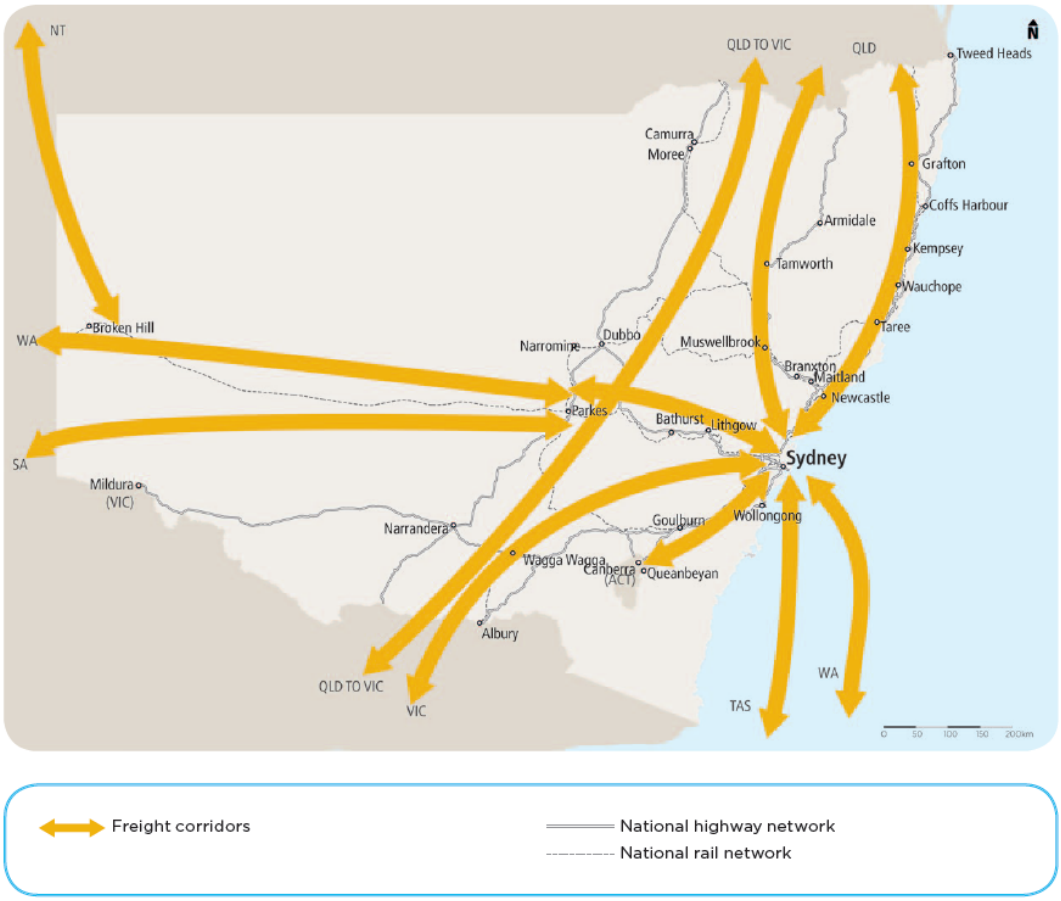
A little lateral thinking would reposition the Customs services and Border Protection to be on the trains and do the processing en-route so that literally there is a minimum of waiting time at Goulburn to connect with flights.

With advances in telecommunications it is now rather easy to arrange for fixed 4G radio base stations to be aligned with the trains and have confidential and public Wi-Fi connectivity on the trains so that commuters can continue their business through country areas where there is otherwise low / nil Internet connectivity, and this Wi-Fi connectivity could / should be provided as standard on all fast trains, and all future trains as standard.

Position a Freight Interchange at Goulburn

The finger painted map (shown below) in the Long Term Transport Plan shows all freight transport going into Port Botany

Figure 7.3 Key non-bulk freight transport corridors in NSW



Apart from the geographic corridors being grossly inaccurate (and that is also raised earlier), these corridors naturally and without lateral thinking incorrectly assume that all future transport will be by Road Freight, when far more efficient and faster freight transport is practical and available by Rail Freight infrastructure.

When looking at the NSW map above, it is relatively easy to see that Goulburn is sufficiently close to Sydney that Goulburn can be the main road / Rail interchange terminal for the whole South / West of NSW, and to Victoria.

Further, for road freight passing through NSW on the eastern coast, this now brings up two new opportunities:

In the first case, with the pair of co-linear tunnels connecting Liverpool to Hornsby, this path allows direct rail connectivity from Albury (Melbourne, Victoria) to Brisbane and beyond into the Queensland coast.

In the second case, road freight travelling to/from Sydney – that is Port Botany, these road freight vehicles can unload/load at Goulburn, directly onto Rail freight cars and these cars can then be efficiently and very quickly transported directly into/from Port Botany in the right order for fast interchange.

The NSW Long Term Transport Master Plan alludes to better Information Technology to improve transport facilitation and this is the prime area where containers can be transferred with a minimum of time because of synchronised and flexible databases together with synchronised rail transport facilities.

The next opportunity is that Goulburn become a main storage point for farm produce in the South / west of the NSW, and from there both Bulk and container transport can be optimised – keeping long haul road freight to a minimum in and around the Sydney Basin, minimising the road damage, and making these roads far safer and far less congested.

The next opportunity is that Goulburn will substantially grow to become a very large city, taking no growth out of the Sydney suburbs, but re-distributing a considerable part of the NSW population out of Sydney.