

Submission to the Standing Committee on Infrastructure, Transport and Cities Inquiry into options for financing faster rail

from Philip Laird, University of Wollongong, November 2019

This submission shall offer some comments on options for **into options for financing faster rail** It shall also address what is regarded as deficiencies in planning for faster rail along with a substantial deficit in rail infrastructure and shall draw on research conducted at the University of Wollongong. However, the submission does not necessarily reflect the views the University.

1. Financing rail

What can be said? Financing rail can be done by either by government outlays, and/or by the private sector. In the case of the private sector, this is invariably done with a view to getting sufficient traffic to cover the construction and operating costs. For freight, this includes extension of existing iron ore railways, or construction of new ones; from information given by the Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2018 *Trainline 6, Statistical Report*, this amounts to 746 km between 2010 and 2015 (inclusive).

For passenger lines, setting aside most urban lines, but not Perth to Mandurah as it extends some 72 km with trains averaging about 85 km/h, and Brisbane to the Gold Coast, it is relevant to ask how the Queensland Rail Mainline Upgrade of the 1990s and Victoria's Regional Fast Rail (2001-06) and subsequent upgrades were funded. Also of interest is how the Alice Springs to Darwin railway (completed 2003) was funded. Further details of some of these projects are given in Appendix A as examples of cost effective rail projects.

The Queensland Rail Mainline Upgrade, along with facilitating faster and heavier freight trains, allowed for the introduction of tilt trains moving at speeds of up to 170 km/h initially (now 160 km/h).

Victoria's Regional Fast Rail allowed for conventional trains operating at speeds up to 160 km/h. . The success of these new services was outlined in a 2014 report by the Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2014, *Improving regional passenger rail services*. This report also notes the subsequent Regional Rail Link upgrades. Currently, the fastest trains between Melbourne and each of Ballarat and Bendigo average over 100 km/h.

Western Australia also has a train moving at speeds up to up to 160 km/h. This is the Prospector, a conventional train capable of a speed of 200 km/h. This would not have been possible without the Kalgoorlie-Perth gauge standardisation that included a new route through the Avon Valley, completed c1969, for the most part, with significant federal funding.

2. Raising funds

As noted by the Committee in a previous inquiry, value capture offers one of many options. It works in other countries, and has worked in Australia in the past, notably, helping to construct the Sydney Harbour Bridge. As noted by the Australasian Railway Association in a 2014 submission, "Role of public transport in delivering productivity outcomes", ... "one third of the construction of the Sydney Harbour Bridge was funded through a betterment tax imposed on landowners north and south of the harbour who were recognised as beneficiaries of linking the city and Sydney's North Shore. The levy was imposed for 15 years at 0.2 per cent on the unimproved capital value of the lands. "

The flip side of this approach is dramatically demonstrated by the extensive development of apartment buildings near Wollli Creek station in Sydney since it was opened in the year 2000 as part of a new airport railway. In the past 19 years, this new railway station has generated much transit

orientated development, and continues to do so, with evermore new apartment buildings currently under construction.

Unless the New South Wales Government or its Rail agencies have an interest in the land, the developers have done well over the years from the station. As indicated (Aust. Fin Review 29th Jan 2016 "lobby groups warn value capture a property tax" citing the Shopping Centre Council of Australia, and, the Property Council of Australia, many developers would like the status quo to continue.

Value capture is just one way of raising revenue for much needed infrastructure. It is respectfully suggested that more attention is needed to true 'user pays' and 'polluter pays' pricing for roads and rail. The issues re transport pricing were well addressed in 2003 in an official report on Sustainable Transport for the NSW Government. However, the recommendations on fares and road pricing in this report by Mr Tom Parry were rejected by the government of the day. Governments at a federal and state level could do well to revisit the 2003 Parry report.

In 2004, an AusLink White Paper raised the options of congestion pricing in major cities and mass distance location for the heavier trucks. The latter issue was revisited by the Productivity Commission in 2006; 13 years on, the need for reform of road pricing is growing.

Here, some guidance may be found across the Tasman Sea where New Zealand has had mass distance pricing for trucks for more than 35 years now and petrol excise now exceeds 50 cents per litre, with funds diverted to rail as well as road.

In a similar way, there is scope for reform in pricing of urban rail transport. This could well include getting more people to use rail to access the domestic and international terminals at Sydney Airport. This was outlined in a 2014 report "Removing or reducing station Access fees at Sydney airport" by General Purpose Standing Committee No 3 of the NSW Legislative Council.

3. NSW Rail infrastructure deficit

New South Wales has a large infrastructure deficit and this will require significant funding to remedy. Whilst this in part is being addressed by completion of the North West Metro in 2019 to be followed by a Sydney Metro-City (with a harbour tunnel crossing) and Metro-South West to be operational by 2024, and a new light rail down George St and out to UNSW shortly to start operation, many rail deficiencies remain. Some of these are now listed.

For rail connections from Sydney to the two largest regional cities of New South Wales: "As Newcastle and Wollongong grow in size and importance to the NSW economy, they need faster and more efficient links to Sydney" (Transport for NSW 2012, Draft Transport Master Plan as noted by the 2012 State Infrastructure Strategy of NSW) Infrastructure NSW.

This report "assesses how faster rail journeys from the Illawarra and Central Coast to Sydney would help enable this integration and support these regions." ... also, this 2012 report on page 107, notes "An incremental program to accelerate the intercity routes is proposed, with a target of one hour journey times to Sydney from both Gosford and Wollongong, and a two hour journey time from Newcastle. The focus of the program will be operational improvements supported by targeted capital works to reduce journey times."

In 2004, Prof Ian Gray [*A future for regional passenger trains in New South Wales*, Local Government and Shires Associations of NSW, and Charles Sturt University] commented on regional passenger trains in New South Wales, and found appreciable scope for improvement, noting (p9), inter alia, a lack of investment in New South Wales contrasted with "*Queensland, Victoria and Western Australia where governments have developed track and equipment to take advantage of late 20th century technologies...[and] straightening the track is essential to increasing train speeds.*"

3.1 Faster trains to Newcastle

Faster trains between Sydney and Newcastle were promised in 1998 in the official NSW *Action for Transport* Statement to be delivered in two stages, the first stage by c2007.

The worst aligned sections of track linking Hornsby and Newcastle are now overdue for realignment. This section is now one of the most congested sections of double track in Australia, albeit more from frequent passenger trains rather than from commercial freight activity.

One simple strategy would be to revert to the alignment in place in the late 19th Century. This would save about 3 km of point to point distance. Grade and curve easing of the original alignment would give further benefits.

Other ways of speeding up Newcastle Sydney trains include higher speed turnouts at various locations, easing of tight radius curves, and the use of new higher powered trains. To achieve the two hours transit time, work will be needed on several fronts.

With federal funding advanced in 2018 towards a business case for an upgrade, the question the Committee may like to raise is what has happened to this report.

In addition, there is considerable scope for improvement in the Maitland to Brisbane line, on top of the work done by the ARTC in recent years. A case study of a major deviation between Hexham and Stroud Road was noted in a 2007 report by this Committee (*The Great Freight Task: Is Australia's transport network up to the challenge?* page 116). Here, the construction of 67 km of new track would replace a substandard 91 km section to halve transit times and reduce fuel use by 40 per cent. A Hexham to Fassifern link (see *Infrastructure NSW 2012* report) would also give good benefits.

3.2 Wollongong to Central Station in one hour by train ?

Faster trains between Sydney and Wollongong were promised in 1998 in the official NSW *Action for Transport* Statement to be delivered by 2010. This envisaged a new Waterfall-Thirroul Route to reduce train transit times by 15 minutes.

The length of the existing Wollongong - Central track is about 83km. As noted by Oakes CJ, 2003, *Sydney's forgotten Illawarra Railways*, ARHS (NSW), the present track is the result of two deviations; Helensburgh (in sections, completed 1915), and Stanwell Park (completed 1920). The two deviations were built as double track at easy ruling grades to replace single track on steep 1 in 40 ruling gradients. However, the cost included an additional 5km of distance, and many tight radius curves.

Wollongong station is some 83km from Central. From Thirroul to Central, the distance is about 70km. The current average speed of about 55 km per hour for the fastest Wollongong -Central trains is too slow. Perth Mandurah and Geelong Melbourne trains average 85 km per hour.

A related issue is completion of the Maldon Dombarton rail line, which was raised in a 2018 report "Regional development and a global Sydney" of the Legislative Council Standing Committee on State Development, whose Recommendations included (no17) *That the NSW Government explore options to bring forward construction of the Maldon to Dombarton railway line, and Blayney to Demondrille railway line, including seeking funding through the National Rail Program to develop a detailed business case for the construction of the links.*

This Committee in its report noted the South West Illawarra Rail Link (SWIRL) proposal released in August 2017 of the Illawarra Business Chamber, where "SWIRL would substantially reduce travel times between Wollongong and Campbelltown, Wollongong and Liverpool and Wollongong and Leppington. SWIRL would also provide over 1,100 additional permanent jobs in

the Illawarra; the comments of Mr Robert Millar, Policy Manager, Infrastructure, NSW Business Chamber noting the projected freight increase from Port Kembla over the next 20 years; and, 'improved transport connectivity to the industrial heartland of south west Sydney', including the new Western Sydney airport; and 'accommodat[ing] potential increases in coal and other freight moving between Port Kembla and Sydney'.

Further support during 2018 for completing the Maldon Dombarton link has come from the Committee for Sydney in its MegaRegion proposal.

In April 2014, NSW Ports Consortium, leased the Port Botany along with Port Kembla for 99 years from the NSW government in 2013 for \$5.1 billion. In late 2014, the NSW Government invited expressions of interest from the private sector to complete this line. Two submissions were received by April 2015, were reviewed, and neither was taken up by the NSW Government. **It is likely that some government funding will be required to facilitate the completion of this rail link.**

The constraints on existing roads and railways and the ongoing expansion of Port Kembla mean that the case for completing the 35 km Maldon - Dombarton link is now stronger than it was in 1988 when worked on it was suspended. Completion of the rail link will bring benefits in separating freight and passenger trains, not only to Wollongong and Port Kembla, but also Sydney and other parts of New South Wales.

3.3 Sydney to Canberra

A Sydney Canberra Higher Speed Train could be developed on an incremental basis.

Stage 1 could be for a new, improved alignment between Goulburn and Yass with a spur line from Yass to North Canberra.

Stage 2 could be for track upgrades from Mittagong to Goulburn and for a Wentworth route between Menangle and Mittagong that could tie in with the Maldon Dombarton line.

Stage 3 Could be further upgrades to Campbelltown to Sydney, which has recently been upgraded.

All stages would require planning, legislation and environmental impact assessment. Where possible, new construction should be to Higher Speed Rail standards of 160 to 240 km/hr standards. An indicative cost is \$3.5 billion (2014 Michell M Martin S and Laird *Building a railway for the 21st century: bringing high speed rail a step closer*, Conference on Railway Excellence, Adelaide Proceedings p 612 -621).

A Sydney Canberra Higher Speed Train operating by 2024 at speeds up to 200 km/h on deviations and taking less than two and a half hours is quite feasible. This could be followed by more new HSR track and faster trains to get down to the former Speedrail target of 84 minutes, and later down to the 2013 Phase 2 HSR time of 64 minutes (which had an estimated cost of \$23 billion).

3.4 Sydney to Orange

There is considerable scope for track straightening between Lithgow and Orange, mainly by following original disused alignments, as recommended by the Orange Rail Action Group (ORAG) in 2014.

In May 2019, a petition of the residents of the City of Orange and Region circulated by ORAG was tabled in the Legislative Assembly of NSW. The petition was signed by over 10,000 persons and this led to a debate of the issues on 20 June in the Legislative Assembly. It called for support and funding for --

- An early morning fast passenger train direct from Orange to Sydney and its return in the same afternoon;
- Rail infrastructure upgrades of the Main Western Line to support fast passenger rail and freight rail services; and,

- Early commissioning of the new Regional Rail Fleet on the Main Western Line.

4. Corridor identification and protection

It is submitted that there is little point speculating about faster rail, until the necessary land corridors needed for either new tracks or upgrading existing tracks are identified and protected.

After studies and extensive community consultation going back to 1996 by Queensland Rail, a route between Grandchester and Gowrie was protected by Queensland Transport in 2004. This included a tunnel of length 6 kilometres, and may be used for a future Inland Railway linking Melbourne and Brisbane via Parkes.

As noted in 2005 (Track and Signal, Oct-Nov-Dec, page 77) by Queensland Transport Minister, Hon Paul Lucas MP, there is a need to “...reserve rail corridor land before it becomes a costly issue.”

The Queensland government appears to have acted on this advice. It is understood that a rail corridor has also been protected between Varsity Lakes on the Gold Coast to the Gold Coast airport; including a part in NSW adjacent to the Pacific Highway where this highway crosses the NSW Queensland Border.

However, with the exception of the partly completed 35 km Maldon to Dombarton rail link, the record of the NSW Government in rail corridor protection for new lines or the upgrading of existing lines is not a good one.

In July 2017, Infrastructure Australia, released a new policy paper [Corridor Protection: Planning and investing for the long term](#). This paper outlined how protection and early acquisition of just seven corridors identified as national priorities on the [Infrastructure Priority List](#) could save Australian taxpayers close to \$11 billion in land purchase and construction costs.

These strategic corridors are: East Coast High Speed Rail, Outer Sydney Orbital, Outer Melbourne Ring, Western Sydney Airport Rail Line, Western Sydney Freight Line, Hunter Valley Freight Line, and Port of Brisbane Freight Line.

The report notes how early protection of a Perth to Mandurah rail corridor assisted the construction of this railway. Opened in December 2007, using Australian made rolling stock (electric multiple units made in Maryborough Queensland) this 72 kilometre railway line with frequent and fast trains now carries more than 20 million passengers per year,

The issue of corridor protection has also been addressed in numerous High Speed Rail studies. The securing of the entire Alice Springs to Darwin rail corridor was a major reason why the project, once contractual arrangements were made, could be constructed in the relatively short time of 29 months.

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APPENDIX A SOME EXAMPLES OF COST EFFECTIVE RAIL PROJECTS

Over the past twenty years, such projects include the Queensland Rail Mainline Upgrade of the 1990s, the Alice Springs to Darwin railway (2001-03), Victoria's Regional Fast Rail (2001-06), and, the Perth to Mandurah Railway (2003-07).

Queensland Rail Mainline Upgrade

Up to 1986, the Brisbane -Townsville line was characterized by having low axle loads (15.75 tonnes) with numerous speed restrictions. As part of the civil works carried out in association with Brisbane - Rockhampton electrification during the 1980s, four major deviations were completed along with selected tight radius curve easing. As a result of these works, the transit times for freight trains between Brisbane and Rockhampton were reduced from an average of about 15 hours to 12 hours whilst freight train gross loads were lifted from 760 to 1200 tonnes.

In 1992, Queensland Rail commenced its Mainline Upgrade or MLU at an initial cost of \$526 million. The MLU program had many aspects and included the acquisition of new container wagons and locomotives along with upgrading of bridges and rail deviations and for heavier axle loads and faster trains. Some 672 old timber bridges between Brisbane and Cairns were replaced with concrete box culverts or concrete bridges and a further 157 bridges were strengthened. In addition, MLU included no fewer than 45 rail deviations between Nambour and Townsville. The average cost of these deviations, extending for about 160 km and built to modern engineering standards, was just \$1.3 million per kilometre.

Track upgrading work under MLU allowed the maximum weight of a freight train behind a locomotive to be further increased to 1500 tonnes for a 2800 class locomotive. Brisbane - Cairns freight transit times fell from 40 hours to 27 hours.

As a result of the improved train operations, QR was able to maintain freight tonnages and live stock traffic on its North Coast Line (NCL). This was at a time when rail freight operations came under increased competition from road freight. Along with faster and heavier trains, the completion of MLU resulted in an improvement in reliability of freight train movements, and, provided track infrastructure of sufficient quality to support rail - rail competition on the Brisbane - Cairns corridor.

In summary, MLU and other work allowed intermodal rail freight to grow to over 3 million tonnes pa by c2005 (as noted by the AusLink Brisbane Cairns corridor study).

In addition, MLU supported the introduction of passenger tilt trains, as of 1998.

Whilst MLU was followed by more track investment, including straightening and duplicating 14km of rail line between Caboolture and Beerburum by 2008 on a much improved alignment, further investment is now required on the North Coast Line. Comment on this follows in Section 3.

Alice Springs to Darwin railway

After nearly a century since an intergovernmental agreement between the Commonwealth and the Government of South Australia (c1908) to provide a railway between Adelaide and Darwin, a 1420 km line was completed from Alice Springs to Darwin, in late 2003.

The time to all but finish the job, from "financial close" in April 2001 to September 2003, was a record 29 months. This was for less than \$1m per kilometre. In fact, the construction cost an average of \$800,000 per km. This followed good planning with corridor protection and some preconstruction, and involved construction on four fronts, with two each centred at Tennant Creek and Katherine.

The first revenue freight train left Adelaide on 15 January 2004 for Darwin and was followed in early February by *The Ghan* passenger train. By mid 2005, demand was so high that a weekly Adelaide - Darwin *Ghan* service was made into a twice-weekly service. Freight services, initially three intermodal trains each way each week, within a few years, expanded at five or more such trains winning over 90 per cent of the SA-Darwin freight market. To this were added ten bulk trains (four Bootu Creek Mine Manganese and six iron ore) and trains carrying piggyback oil tanker trucks.

Victoria's Regional Fast Rail

Regional Fast Rail (RFR) included some 500 route km of track being upgraded to modern standards with heavier rail and extensive resleepering and new signalling systems. The most notable part of the RFR track upgrades was an 8.2 km deviation bypassing the curves at Bungaree east of Ballarat. The deviation included two of Australia's largest rail bridges, spanning Lal Lal Creek (363 metres) and Moorabool River (270 metres).

The track and signalling upgrades on all four corridors were completed by early 2006 and new V/Locity trains (made in Victoria) were then tested. The initial cost was \$550 million, with later safety requirements incurring extra cost.

The new trains, moving at speeds up to 160 km/h, were well received by the travelling public. Within a year, patronage increased by some 30 per cent and within five years, patronage had doubled. It has since grown, to the extent that the initial order for 29 two car sets, over time, went to 58 three car sets - a three fold growth. Further and substantial improvements were made over the next 6 years, with about \$3 billion of federal funds in the Regional Rail project (in part to separate regional lines from suburban lines in Melbourne).

Now, a third wave of track upgrades and more trains is being delivered, again with some federal funds (including over \$1.5 bn promised by PM Turnbull in winter 2017, with more federal funds for the line to Albury.

Perth to Mandurah Railway

The 72km Perth Mandurah railway was completed in 48 months, and opened on December 2007. The cost, as noted in the book "48 months – 48 minutes" (Longhurst, D., 2008, Rowlhouse Publishing) was about \$1.184 billion. The electric rolling stock, made in Queensland, cost about \$300 million.

The route of the project was changed to include more direct access to Perth after a change of government by Minister Alannah MacTiernan, who managed to gain (p23) "the extra funds that were required from the Treasury."

The project included two underground stations. The average cost, excluding rolling stock, was about \$18 million per kilometre. The Perth to Mandurah project, officially opened in December 2007, has proved surprisingly successful. Data released Public Transport Authority (PTA) of WA for 2012-13 patronage data shows a record 65.5 million rail trips for the Perth Urban rail system. Of these trips, some 21 million were for the Perth to Mandurah railway that became operational in December 2007. Moreover, PTA data shows Perth bus patronage growing each year since the Mandurah line was opened.

APPENDIX B CONCLUSIONS FROM FIVE CONFERENCE PAPERS

1. Michell M and Laird P, 2016, 'Thinking outside the fence line – Sydney to Brisbane' Conference on Railway Excellence
2. Laird P and Michell M, 2017 *Shorter south coast train transit times* AusRail Plus, Brisbane, Australasian Railway Association
3. Laird P and Michell M, 2018 *Canberra Rail - to be or not to be* Conference on Railway Excellence, Sydney
4. Michell M and Laird P, 2019, *Speeding Up Nsw Main West Transit Times* AusRail Plus, Sydney, Australasian Railway Association
5. Martin, S., Laird, P. and Michell, M 2014, Building a railway for the 21st century: bringing high speed rail a step closer, Conference on Railway Excellence , whose summary follows

Sydney Newcastle (2016)

In this paper the authors have looked at two strategies that could be adopted to improve parts of the main line interstate rail network that have substandard alignments.

Restoration of the original steeply graded alignments (where they exist) can have some small operating benefits which would be amplified if curves on the restored alignments were to be flattened at the same time. This strategy is realistically limited to a few sections of main line radiating out from Sydney. In the case of Sydney – Broadmeadow this strategy on its own may well be necessary but not sufficient to achieve the desired two hour travel times – this can only come from a package of infrastructure works, many relatively minor, along with higher performance trains.

Curve easing within the fence line (i.e. without land acquisition) can produce measurable results but requires a rather fragmented set of minor projects to achieve, and may well mask the holistic opportunities for improvement.

A staged approach to alignment improvement, provided it is properly thought through and planned in advance, would allow for incremental improvements as funding became available with reduced risk of ineffectual outcomes or stranded capital. An important part of the process is planning, with identification of the land required, and its early reservation for future work.

Sydney South Coast (2017)

This paper considers strategies that could be adopted to improve parts of the Waterfall to Otford section of the South Coast railway that have substandard alignments.

A strategy of restoration of the original steeply graded alignment between Waterfall and Otford but with double track tunnels and much easier curvature would be a key feature of any substantive line improvement.

Additional time benefits would come from better pathing, additional new alignment between Otford and Coledale and selective curve easing south of Coledale, sufficient to achieve a 60 minute express train timing for Wollongong trains (and trains to all points south of Wollongong)

There would also be some benefit in completing the 35 kilometre Maldon Dombarton rail link for freight trains as a means of enhancing capacity for passenger trains between Hurstville and Wollongong as well as enhancing reliability of passenger running.

Sydney Canberra (2018)

This paper has proposed, rather than High Speed Rail, a middle ground approach to achieving faster passenger rail transit times. Collateral benefits for freight trains would be an advantage. Routes such as Sydney – Canberra have barely improved over a long period of time and train services have a poor frequency. Since the 1950s, bus times on the now fully upgraded highway have been halved and they are now both noticeably faster than trains and operating at much higher frequencies.

The authors are proposing a *stepping stone* of a medium speed strategy (by world standards) with track upgrades and new trains of matching capability. In time, this could well become part of the future Melbourne – Canberra – Sydney – Brisbane HSR line.

Improved rail services for Canberra can be achieved, but only if all involved work together to get an actionable plan that is realistic and affordable. A number of independent projects are already afoot, notably provision of a new TrainLink fleet to replace the XPT and XPL trains. There has been some indication of interest from the ACT Government, and to a lesser extent the NSW Government, and a regional rail advocacy group has evolved.

There is a need for government to take action to identify and preserve corridors for future rail deviations.

Sydney Orange (2019)

The paper outlines the development of the NSW Main Western line linking Sydney through Lithgow to Orange that was completed in 1877 as single track for most of its length. During the 1914-1920 period, duplication and grade easing between Lithgow and Orange was undertaken at the expense of 15 km of additional distance and with many tight radius curves. Current Sydney to Orange passenger train (XPT) times are 4h 44m for a 323 km journey. This paper starts from the premise that an average transit speed of 80 km/h should be the minimum achievable in this day and age, equivalent to a four hour journey time between Sydney and Orange. The authors look at how such a gain might be achieved and to what extent even better times might be achieved with more substantial improvements.

This paper complements earlier papers by the authors including reducing each of Sydney – Newcastle, Sydney Wollongong and Sydney – Canberra train transit times.

Also of note is a 2014 paper *Building a railway for the 21st century: bringing high speed rail a step closer*, Conference on Railway Excellence , whose summary follows:

High Speed Rail (HSR) operating at maximum speeds of above 250km/h with electric passenger trains are now operational in at least 11 countries. As the feasibility of building an Australian East Coast HSR network between Melbourne, Sydney and Brisbane is once again being examined, governments at Federal, State and Local levels need to develop complementary transport infrastructure and services to ensure the long-term financial and operational success of HSR.

The lengthy time frame currently envisaged for completing the first stage of an Australian East Coast HSR network by 2035 provides a 20-year window for improving and upgrading urban and regional rail systems to make them 'HSR ready'.

This paper explores an incremental approach to providing a HSR network that will allow progressive enhancements rather than the currently recommended 'big bang' approach and identify changes required to produce a healthy intercity rail network to complement a successful HSR network