

Sydney Metro & High-Speed Trains

Summary key actions:

1. Cancel the "City & SW Metro", which along with current plans for light rail and WestConnex represent poor value-for-money and are unaffordable anyway (see [attached letter to NSW Premier](#)).
2. Replace most of the existing & planned light rail in Sydney with metro rail.
3. Prioritise earlier delivery of the West Metro, running it from Sydney CBD (connected into the existing City Circle) through the Westconnex tunnel (with less lanes for cars) to Parramatta, then continuing to Penrith on existing rail lines (replacing existing services).
4. (*outdated - too late!*: Run NW Metro trains along existing tracks from Epping to Strathfield then the CBD, to avoid closing and converting Epping-Chatswood until after...)
5. Conversion of the existing harbour-bridge crossing to higher-capacity, single-deck metro trains operating at 30 trains per hour (avoiding any need for the currently planned "Sydney Metro City & SW").
6. Conversion of the entire Sydney Trains network to fast metro trains (which are faster than double-deck trains, due to reduced station delays especially).
7. Build a high-speed train line from Parramatta to Badgerys Creek airport, probably via Liverpool, and plan to extend fast services north and south of Sydney to new/expanded commuter towns (such as Wollongong, Canberra, Gosford & Newcastle).

If you like this alternative Sydney Metro plan, show your support by 'liking' it at this [FROGS Facebook site](#).

The original plan is 4 years old now, but it may not be completely too late - see the 2019 update near the end.

Economic & demographic context

In 2016-17, Australia's economy is at a critical turning point. The world economy faces at best a gloomy growth outlook and many commentators think [a new debt crisis & recession is almost inevitable](#).

As the welcome progress of renewable [energy](#) hits the future prospects and current price of fossil fuels, the situation in the middle east is becoming even more volatile. Refugees pose a huge humanitarian and economic problem for Europe ([but have no-one to represent them](#)), and Australia has failed to

develop a supportive response that is compassionate, economically sustainable and effective in deterring dangerous people-smuggling.

Within Australia, the mining boom is over and as "fly out" workers come back to NSW & Sydney, the population surge has temporarily boosted Sydney's housing market, but the resulting [housing affordability](#) pressures are now discouraging further population inflows, so Sydney's property market - the only thing that's been keeping the Australian economy going - is poised for a slowdown or to [crash 10% or more in a couple of years](#), if not [sooner](#). [Some banks express more optimism but then they can afford to as long as prices don't fall more than 25%](#). I've been unsuccessfully predicting imminent economic crisis for over a year now - my latest forecast being early 2017, in reaction to [government pre-Xmas economic updates](#) & the [losing of AAA ratings](#), although if the [credit rating agencies can't see a problem](#), maybe no-one else will either! (update 16 March 2017 - I got it wrong again, although with [house prices now defying belief](#), maybe it's 'the market' that has got it wrong? And yes, finally, by 22 May 2017, the [credit ratings agencies see a crash coming soon](#)... and it's taken so long for people to face reality, [the correction now occurring in 2018-19 could be that much more painful](#)...)

Given the importance of property stamp duties, these economic risks have potentially major implications for the financial position of the NSW Government, which has sold the profitable TransGrid & other electricity businesses and is also selling further assets to fund major new infrastructure investments, but must ensure such investments promote growth in the economy and tax revenues to offset the lost dividends from these commercial assets over the medium-term. Whilst we need to [transform financial management frameworks](#) to properly assess this, it seems clear to me that [current infrastructure plans are unaffordable \(see attached letter to NSW Premier\)](#), and not good projects anyway.

So what should we do? Although Australia cannot rely forever-more on population growth to support its economy (which would just be a [massive ponzi scheme](#)), in the short to medium-term (i.e. the next few years and perhaps for more than a decade) population growth may be the only thing that can prevent the economy stalling and buy us some time until we can transition from a [dumb reliance on resource-extraction](#) to a knowledge & innovation-based economy (& reap the benefits of other [Australian public sector reforms](#) over the longer term).

Australia has plenty of spare land to support a higher population, but to be economically beneficial, immigrants need to be able to interact with existing high-productivity economic centres. Right now that's constrained by [Australia having too few cities](#), and in both Sydney & Melbourne, having a so-called "Central" Business District (CBD) that's far from the *geographic and population centre* of the metropolitan area (which is now just west of Parramatta for Greater Sydney), which in NSW is largely due to its *extremely slow & inefficient trains*, which make it hard for people in Sydney's west to access the CBD - thus reducing demand to live in outer suburbs. The [high cost of housing](#) concentrated into Australia's few cities (worsened by a cultural history/expectations and restrictive planning rules that make [Australian homes the biggest in the world](#)) also sets a limit on how low welfare benefits can be

without making people homeless or forcing them to live in jobless areas (with resulting welfare dependency), and these [high welfare payments reduce work incentives \(though not as much as some claim\)](#) and impose large costs on taxpayers and the economy.

The solution to all this is the same as what every other global city has done - fast trains to connect distant, more affordable land to existing economic centres.

So NSW's economy needs an *affordable* transport investment strategy with world-standard train services to address existing network constraints and to support new affordable housing and population growth in outer areas with acceptable commuting times to existing economic centres (e.g. about 1 hour or less).

But if we build it, will they come? Will people move to outer areas, and how fast will they settle there? In economics (as in [relativity](#)), time matters - otherwise we can't afford the interest on debt.

Well, besides the diversion of existing Sydney residents seeking more affordable housing, one option would be to *bring in people currently suffering in [Australia's off-shore detention centres](#) or [middle-east refugee camps](#)*. I'm sure they will gladly come and contribute positively to continued growth of Australia's economy ([sign this petition if you agree](#)).

So will plenty of Brits as they flee the [economic panic from Brexit](#), potentially taking advantage of easier immigration that Britain should now negotiate with sunny Australia!

Fast trains for affordable housing

What infrastructure and service plan can deliver on the above aims?

A fast rail service connecting Sydney CBD and Parramatta is the top priority, to support strategic land-use development as well as relieve existing rail network capacity constraints.

But Sydney's double-decker trains are very slow, infrequent and low capacity (because of their excessive dwell time at stations for boarding & disembarking), so we need more than new rail lines; we need a total transformation of the whole network.

See the files attached at the bottom of this page & summarised following for **an integrated, high-speed solution to Australia's transport, housing, economic and refugee problems:**

- ['Fast rail for western Sydney'](#) - a strategic economic business case for a new *fast* metro rail line from Sydney CBD to Parramatta (in less than 20 minutes)
 - *the strategic solution to improving employment productivity, transport efficiency and housing affordability in Greater Sydney.*

Consistent with my ideas here, see also:

- Reports by *10,000 Friends of Greater Sydney* ('FROGS'):

- [Land planning perspective](#) - highlighting the Sydney CBD to Parramatta corridor as comparable to Manhattan
 - [Metro Rail Plan Stage 1](#)
 - [Response to Commonwealth High Speed Rail Phase 2 Report](#) - emphasising the importance of staging projects to manage investment risks, e.g:
 - fast metro from Sydney CBD to Parramatta,
 - [faster \(than current\) trains to Wollongong](#) through partial upgrades to existing tracks (see my [attached slides](#), using a [discount rate that I discuss here](#)),
 - then similarly on to [Canberra](#), then north to Gosford & Newcastle,
 - then major investment in new lines to these locations and beyond with [High Speed Trains](#) (HST), Magnetic Levitation ([Maglev](#)) systems or potentially even [Hyperloop](#) or new [automated vehicle technologies](#).
- [Summary](#) or [full report by Interfleet on rail network strategy](#), provided as [expert advice](#) for [Infrastructure NSW's 2012 recommended State Infrastructure Strategy](#) - emphasising the opportunities to improve the performance and capacity of the Sydney rail network by using high-frequency metro trains, rather than expensive new track and tunnel infrastructure.

- **[Sydney Sustainable Housing & Integrated Transport Strategy](#)** - my submission to [Sydney Metro](#), June 2015:

(NB. original file had my ball-park 10-year 'funding gap' guesstimate for current NSW Government plans, which is now outdated but [I'd still guess it's over \\$10bn.](#))

An integrated plan for fast "metro" trains (at ≈120 km/h) & High Speed Trains (> 200 km/h) to support new affordable housing supply in Sydney, potentially also combined with a revised WestConnex motorway tunnel.

- builds on Jim Steer's proposed Fast West Metro from Sydney CBD to Parramatta (& Penrith) under Victoria Road, with a Ryde branch to Epping & the North West Metro ([in his report leaked to the SMH](#)), supplemented with ideas from Russ Lunney (particularly the CBD bus terminal & the Pyrmont-Barangaroo station under Darling Harbour) and myself, including:

- an alternative & **preferred southern route from Sydney CBD to Parramatta via Strathfield**, which offers significant [value-capture](#) opportunities (as recognised by [consortia that have proposed such a line](#) recently & [in the past](#)),

- **Extend the metro from Sydney CBD to the Eastern Suburbs** along the planned light-rail corridor - branching from Central or from Edgecliff to go [via the upgraded SFS](#).
 - Scrap the ridiculous plans for light rail into Sydney CBD and instead use [re-routed and possibly underground buses](#) (NB. See 2019 update below).
 - Subject to affordability and value-for-money, **the metro could be further extended to Maroubra beach and/or from Randwick to Coogee beach and/or Bondi Junction to Bondi beach** (rectifying [past shambles](#)) - connecting more than one beach to avoid overloading a single beach with too many people and to instead enable people to do the wonderful walk between beaches and thereby spread beach demand across both these and the intermediate beaches - ideally encouraged by a year-round rotation of [Sculptures by the Sea](#).
(BTW, Waverley & Randwick councils' failure to fix the coastal footpath along Waverley cemetery at the two councils' boundaries until more than 2 years after the storm damage of June 2016, I take as further good evidence of the need for [council mergers!](#))

- **Fast trains connect employment areas to land for affordable housing:**
 - New metro station supports **urban redevelopment in the Bays precinct**.
 - **HST through Parramatta** connects to cheaper land in [outer Sydney areas](#):
 - **north to Gosford & Newcastle**
 (perhaps using the Carlingford line connecting on to the spare lane in the flat-gradient [NorthConnex](#) tunnel [from Pennant Hills/Beecroft to Wahroonga/Hornsby](#) and then [automated vehicles](#) elevated over the freeway median through the difficult terrain to Newcastle),
 and,
 - **south to Liverpool (probably), Badgerys Creek & Canberra**
 - using 300 km/h [Very High Speed Trains](#) (VHST, e.g. the French TGV),
 or 500-600 km/h magnetic levitation ([Maglev](#)) trains,
 or even (if it can be proven to work), the 1,200 km/h [Hyperloop](#) system proposed by [Telsa's](#) Elon Musk (potentially using lower cost levitation systems than in the active electromagnetic suspension/linear motor used in the German [Transrapid \(commercially operating in Shanghai\)](#)),
 or the Japanese [SCMaglev's](#) superconducting electrodynamic suspension (EDS), which has

reached [600 km/h](#) but is [not due for commercial operation until 2037](#)).

- [CLARA](#) is currently [proposing to government](#) various HST options to be largely funded by value-capture, although it has its [doubters](#).
- The attached *VHSTcalculations.xls* compares travel times for different technologies. Note that the greatest value probably comes from a fast Sydney to Canberra link and most of these benefits could be achieved with existing VHST technology such as TGV (& just regular HST [tilt-trains on existing tracks + perhaps only \\$100m could halve the Sydney-Canberra journey to 2 hours](#) - that's how bad NSW trains are!).
 - Although it may seem contrary, I suspect that a quantitative risk & value analysis could indicate the best approach is to use a proven HST technology from Parramatta to Canberra sooner than later (to meet the pressing economic needs discussed above), with the option to then duplicate this section later with a more costly VHST system that would be better suited to extending the much greater distance to Brisbane, Melbourne & beyond, after having partially demonstrated the demand potential and also possibly reduced the cost and risk of more advanced technology options (like Maglev or Hyperloop).
 - An [Australian Hyperloop](#) system could be developed for passenger and/or freight services, starting with a test-track in South-West Sydney:
 - *A first-stage passenger Hyperloop could extend from Badgerys Creek to Campbelltown (which avoids difficult urban areas for a first system) and then along the Hume Highway to Goulburn & Canberra (initially excluding Bowral until proven switches are developed for off-line stations that avoid delays for express services), as well as north to Parramatta via Liverpool, and then Newcastle and eventually Brisbane. From Canberra it could be*

which seems consistent with [a new Circular Quay Square designed by Cox Richardson](#) that the [Government](#) & [developers are now planning](#)),

- **CBD-White Bay** details refined, including:
 - the **metro using the old freight line at White Bay** (where train stabling could be located) then **replacing the existing [capacity-constrained light rail](#)** to Lilyfield, Leichhardt-North and Dulwich Hill
 - the metro could then branch at Leichhardt-North to continue to Parramatta via Ashfield/Five Dock (possibly running above ground next to the City West Link);
 - **a possible fork right to Rozelle & Epping/NW Sydney** (similar to Jim Steer's original proposal, perhaps in the longer term when capacity is needed);
 - **a potential [cable car](#)** that could connect between Pyrmont's Star Casino and new high-rise buildings at White Bay (including the old power station), Balmain and potentially on to Cockatoo Island and Woolwich;
 - (Possible locations for support pylons or high-rise apartment/hotel stations could be Balmain hospital &/or the old telephone exchange next to Balmain Town Hall via the [Balmain Hotel](#) & the appropriately-named [Exchange](#) - where people could change to buses!)*
 - *a potential light rail line, if warranted after high-density development has occurred in White Bay, although this would compete with walking (being only 1 mile to Cockle Bay), ferries &/or the possible cable car; (the light rail might use the current line to Central by short-cutting the current loop with a tunnel between points south of the Fish Markets & Convention Centre stops)*
 - re-routing of buses to reduce [CBD congestion](#) (instead of trams, which will make it worse!).

- **Opportunity to downscale WestConnex** motorway & integrate it with public transport (details not illustrated), with:
 - (Note the current stand-alone Westconnex project seems to be of questionable viability, especially considering the latest work by [Professor David Hensher](#) on the [lower willingness-to-pay of motorists after taking into account multiple network tolls and personal / household weekly budget constraints](#), which I summarise [here](#).)*
 - Reduced total costs for the West Metro + WestConnex through a **combined rail + road tunnel** using the [WestConnex M4-East-M5 link](#) and potentially running the metro above ground along the widened M4, with the reduced number of road lanes also limited to electric vehicles, in order to encourage their uptake and avoid

the cost of exhaust stacks & systems (which would be a waste of money given the [imminent revolution coming to the car industry](#) and [well underway around the world](#)). The piston effect of trains could also help ventilation for a limited number of hybrid petrol-electric vehicles that could potentially be allowed to use the tunnel for a premium toll.

- Limiting use to only [electric trucks](#) could also enable reliance on [their vastly superior hill-climbing ability](#) to simplify the [design requirements of the problematic, deep underground Rozelle interchange](#), which has become an [unbelievably complex spaghetti junction](#).
- Following the WestConnex/M4 alignment would suggest metro stations at Five Dock [next to Bunnings where the motorway exhaust is planned](#) (which I'm sure locals would be happier about!) then at Strathfield half-way between Homebush & North Strathfield stations ([south of current new metro station plans](#)) with connections to both through pedestrian tunnels, then Sydney Olympic Park (SOP) and possibly Rosehill/Camellia or Rydalmere/UWS (with interchange to the [Carlingford line converted to light-rail](#) if not high-speed trains extending to Epping & beyond, although as INSW recommended in 2012 (see [7.6.2, p.104](#)), a Bus-Rapid-Transit corridor would be more cost-effective).
- The combined metro/road tunnel could continue from a Leichhardt-North metro station (replacing current light rail services) through inner-west suburbs (**central-Leichhardt, Annandale, Camperdown/RPA Hospital/Sydney University** - with possible metro branch to Redfern/Central) and then via Newtown or Erskville & Macdonaldtown to the [St Peters interchange](#) and [M5 connection](#).
- Adoption of the [City of Sydney council's proposal \(apparently not supported by the NSW Government\)](#) for an upgraded A3/Roberts/King Georges Road replacing WestConnex stage-3 for port trucks going between the M4 & M5, plus an M4-East connection to the Cross-City Tunnel, existing Harbour Tunnel, Eastern-Distributor (ED) & airport/port, with the West Metro reducing car demand to match the capacity of these existing roads.
 - A possible variation on this could be to continue the combined road & metro-rail tunnel from the

Rozelle interchange to Barangaroo & Martin Place and connect the road there to the harbour tunnel & ED.

- The City of Sydney council also propose removing the train station access fees at Sydney Kingsford Smith Airport (KSA), but I'd prefer to moderate car demand by taxing KSA's car parks, as well as applying tolls to the M5 as part of broader [road pricing reforms](#).
- Perhaps using the proposed [Western Harbour Tunnel](#) to connect the West Metro & Inner West directly to Waverton & North Sydney metro trains, &/or maybe to give priority to express electric buses going from WestConnex's proposed Rozelle Interchange via a [short 300m tunnel](#) to a central Balmain bus station in the old [11 million litre reservoir cavern under Gladstone Park](#), then on to ["Beaches Link"](#) express bus services (although [at \\$14bn](#) I think it will be a long time before all this is affordable).

Further transport options could also include:

- A footbridge from **Barangaroo to Balmain East wharf**, possibly also carrying ultra-light, [automated GRT vehicles/pods](#) that continue on overhead pylons along the centre of Darling St. to Balmain, Rozelle and Leichhardt.
- [Automated, 30 km/h solar-powered 'flying river taxis'](#) (hydrofoil pods) on Sydney's inner Harbour & Parramatta river (offering better services as well as avoiding water/air pollution and damage to riverbanks).

2019 update

So, four years after first proposing this, it looks like the NSW Government has blindly ploughed on with the appalling projects initiated by former Premiers [Barry O'Farrell](#) & Mike Baird (although given prior history it's hard not to blame the bureaucracy rather than politicians). But when [NSW's finances are finally recognised as being out-of-control](#) (surely soon), it may not be too late to recover the situation:

- The [already-built metro line to a new "Victoria Cross" station](#) could connect to the existing line across the harbour bridge (at or just past North Sydney station, which could join with Victoria Cross via pedestrian tunnels), so as to bypass the slow, meandering country-train service via Wollstonecraft & Waverton,
- the [metro tunnel already dug from Marrickville to Waterloo](#) could potentially be used to link the Bankstown line to Green Square

& Central, and then round to White Bay and the current light-rail line going back through to Dulwich Hill (as per my diagram below), thus - with conversion to metro - producing a full inner-Sydney "Circle Metro" line, and,

- the [metro tunnel from Barangaroo to Blues Point](#) could possibly be used instead of the longer (& more expensive) planned Western Harbour Tunnel for vehicles going to/from North Sydney and WestConnex - connecting to the Rozelle interchange either via the Western Distributor & Anzac Bridge (with traffic levels somewhat relieved by the M5 connection), or via a combined road & metro-rail tunnel from Barangaroo (as suggested above) or via a separate tunnel from Barangaroo-north to East Balmain & a bus station under Balmain's Gladstone Park (as also suggested above).
- As for the ridiculous, disruptive & ineffective waste that is the [CBD light rail project](#), I suppose we could cut our losses and salvage some value by using it as a temporary means of getting train passengers from Central to Town Hall and Martin Place while building a new train turn-back at Circular Quay (although buses could have done the job much cheaper). Then when people see how dreadfully intrusive it is to have trains (which is effectively what [67m-long twin-coupled trams](#) are) passing by nearly [every 1.5 minutes on George Street shopping mall](#) ([without even providing enough capacity to replace the buses](#)) - thus blocking pedestrians from crossing for about one in every three minutes and severely disrupting other traffic - they should demand services (& hence capacity) be substantially scaled back as soon as possible - which may be done once the Eastern-Suburbs light-rail line is converted to metro as per the map below - perhaps by operating less frequent, [single-set 33m-trams](#) from Circular Quay to Central and then on to the existing inner-west light rail line, which would terminate at "Rozelle Bay" for interchange to the new West Metro (which could use the existing light rail lines west of there). With less frequent trams on George Street it may then also be possible to allow some [electric buses](#) down it (e.g. operating inner-west routes), using the [in-road 3rd charging rail](#) that the light rail is proposed to use.
- Finally, converting the Eastern-Suburbs light rail to metro - thus connect Sydney's beaches to Central, Martin Place, the Inner West & Western Sydney - would involve some further tunnels and wasting the 1km of light rail track now laid on Devonshire street (about 8% of the total, I guess costing less than \$100m), but could possibly still use the surface line now built along Anzac Parade (but enclosed to reduce noise impacts) and would enable developers to benefit from greater "value capture", for example by building a hotel next to the Moore Park stadium station, thus [reducing the cost to](#)

[government of the SFS rebuild](#) (quite possibly by more than the amount wasted on light rail).

Whether such changes are viable at this late stage I can't be sure, but if they are then overall there may not be too much waste from what's been done to date (as at October 2019).

Show your support for this Sydney Metro plan by 'liking' it at this [FROGS Facebook site](#) (FROGS' SSHITS beats Baird's Merde!)

Sydney's Sustainable Housing &

A 'Fast West Metro' + Very High Speed Trains (VHST) to su
* davidthorp.net/transpo

- Auction higher density development permits in CBD and at other better-located sites
- Support population & economic growth with fiscally sustainable investment

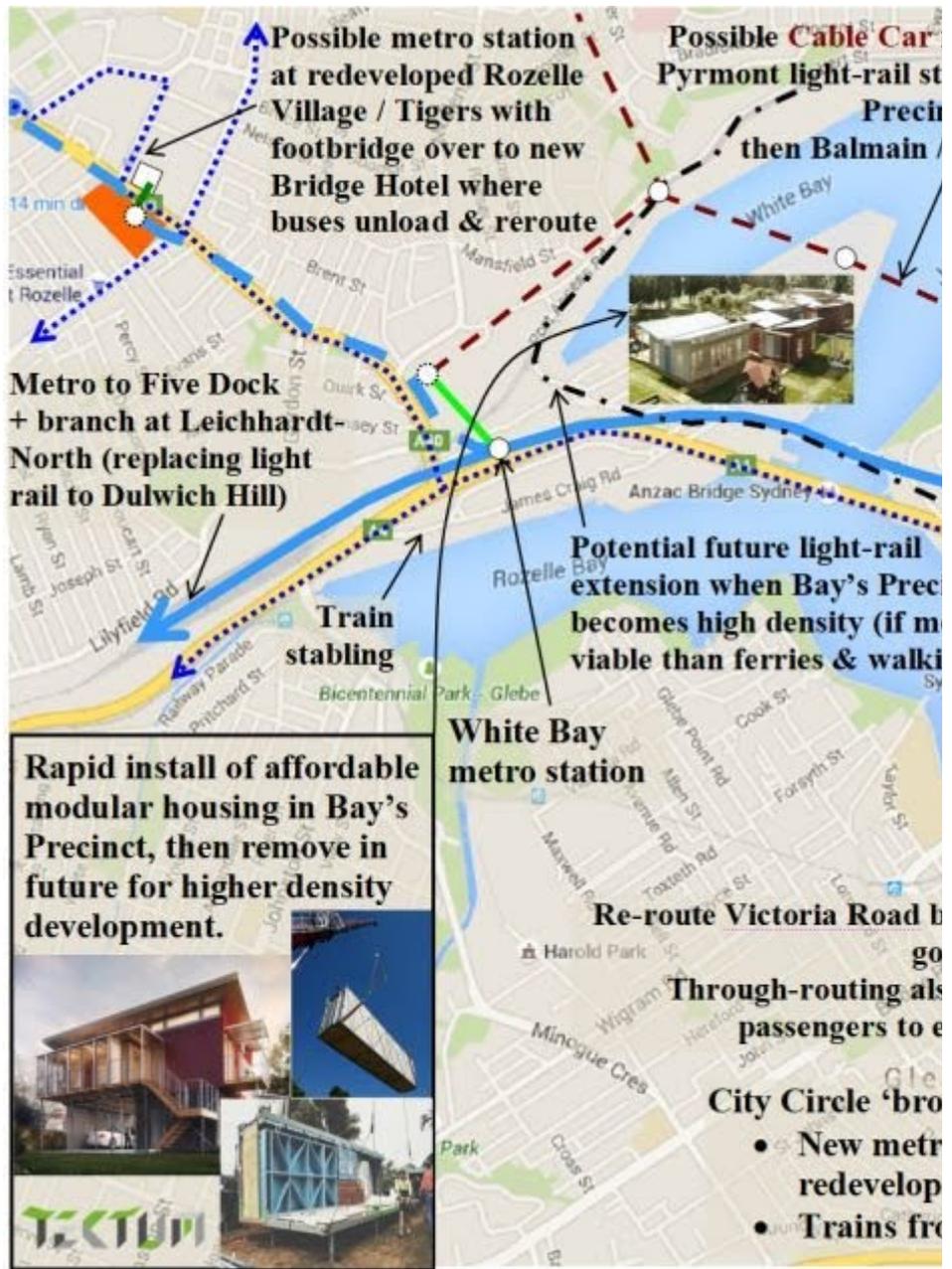
- 1-deck metro: 120kph, 1 min. delay / station (vs 2-3 mins current)
- CBD rail capacity for > 50 years*
- Higher farebox from faster, frequent service; replace higher-cost Sydney Trains services.
- CBD to Parramatta in under 20 minutes (vs current 30-40 minutes) supports employment growth in Parramatta & Western Sydney.
- All-stops metro west of Parramatta: faster service every few minutes - Penrith/Blacktown to CBD ≈ 50/30 mins (current 60 mins from Penrith)

Train System*	tph	Pax/hr	Seats/hr
Double deck	20	24,000	17,800
Single deck	30	36,000	18,000
Single deck max	30	60,000	12,000

various-VHST route options (300kph TGV, 600kph Maglev or 1200kph Hyperloop)

VHST to Canberra

Fast West Metro & Parramatta Strathfield & Ryde & Epping - share tunnels



What next?

Current NSW & Sydney train systems and plans must constitute the slowest & most inefficiently used rail assets in the developed world, and are the product of the closed/secretive and politicised practices of the NSW Government over many years (led by [the same bureaucrats](#), who seem obsessed with [building lots of stations](#) of benefit to developers).

These practices need to fundamentally change, as I suggest in "Seven Habits for Economically Efficient Infrastructure Planning", attached [here](#).

Network plans have an inherent monopoly nature, but the design of an efficient, world-class network needs an open debate with competing views actively encouraged from multiple professional sources outside of government (including mine amongst others).

Once the network strategy is confirmed we should then privatise train operations with the appropriate contract incentives to drive continual incremental improvements ([including for improved maintenance & safety that the current public operator fails to manage adequately](#), and which good

private contracting can improve - [noting that between 2004 and 2015 deaths due to accidents on Britain's railways fell by 74%, compared with a 36% fall in the EU as a whole](#)).

And finally, though it may not be the most important thing, the [ridiculous & unpopular alphabetical signage recently rolled out](#) can be easily covered with operator-customised logos based on international standard pictograms ([the round signs that have been rolling out since 2013](#) almost look like they're designed for something better to be stuck on top!).



-  [Bob Meyer FROGS ...](#) David Thorp, 19 No... v.1 
-  [FROGS Response t...](#) David Thorp, 19 No... v.1 
-  [FROGS Why Fast ...](#) David Thorp, 19 No... v.1 
-  [Fast rail for western ...](#) David Thorp, 8 Mar ... v.8 
-  [Sydney Sustainable ...](#) David Thorp, 25 Feb... v.5 
-  [Sydney-Wollongong...](#) David Thorp, 4 May ... v.1 
-  [SydneySHITS.pdf \(3...](#) David Thorp, 24 Au... v.1 
-  [Unsustainable NSW...](#) David Thorp, 19 Apr... v.1 
-  [VHSTcalculations.xls](#) ..David Thorp, 11 Oct... v.4 

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