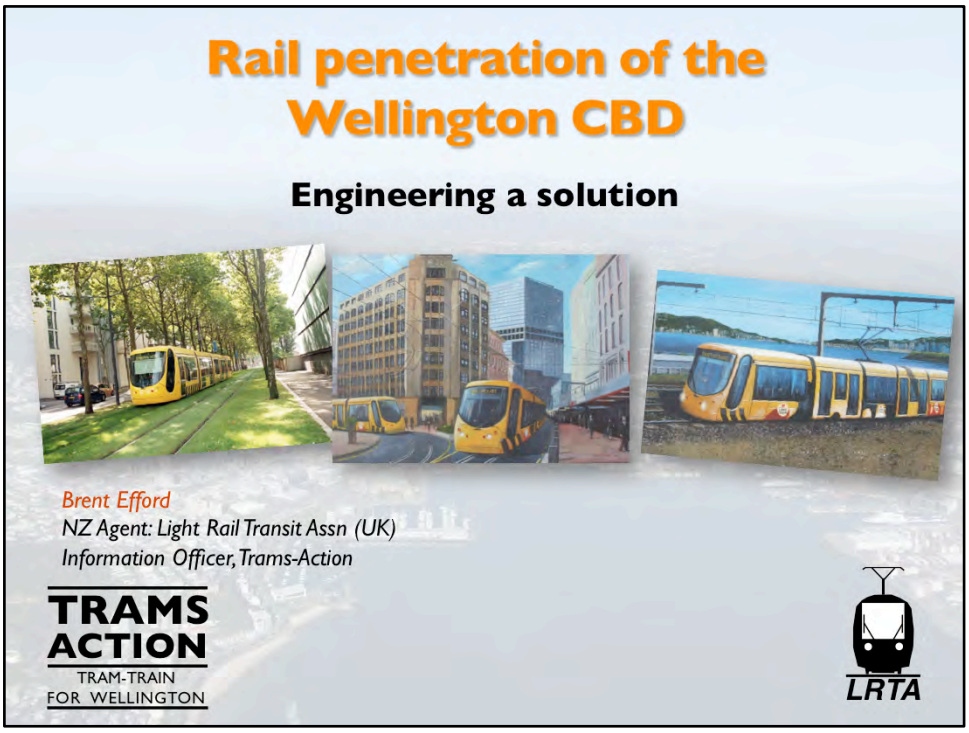


There is a persistent myth in Wellington which holds that Wellington has "great" public transport, and that because we have shiny new EMUs our railway system is now at last "world class".

In fact, the system is one of the most incomplete core rail transit systems in the world. It doesn't achieve that most basic design criteria for rail transit systems: penetrating the regional CBD.

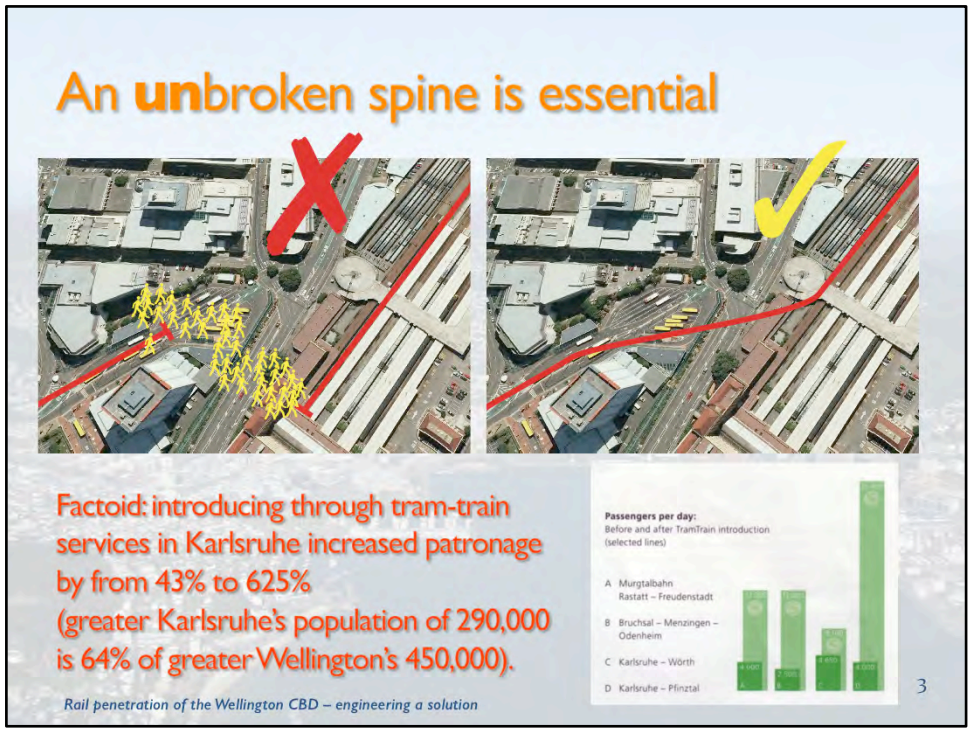
We need a complete rail system as the spine of a 100% electric public transport system to take the pressure off the roading network, meet our climate change commitments, and improve public health and urban liveability.

Wellington is particularly well suited to a continuous rail spine.

Now that a top-level agreement to mitigate and adapt to climate change has been reached, and ratified by NZ, the onus is now on every local jurisdiction to put it into effect.

In this we have a head start. Electric public transport and local renewable power is our 'low-hanging fruit' – a good start for doing our bit for adapting to a post-carbon world.

Our geography also makes Wellington among the most promising cities in the world for an aggressive incremental expansion of our existing electric public transport system into a post-carbon 100% renewable electric system which could successfully displace a lot of car commuting and be a cheaper alternative to the continuing expansion of the state highways.

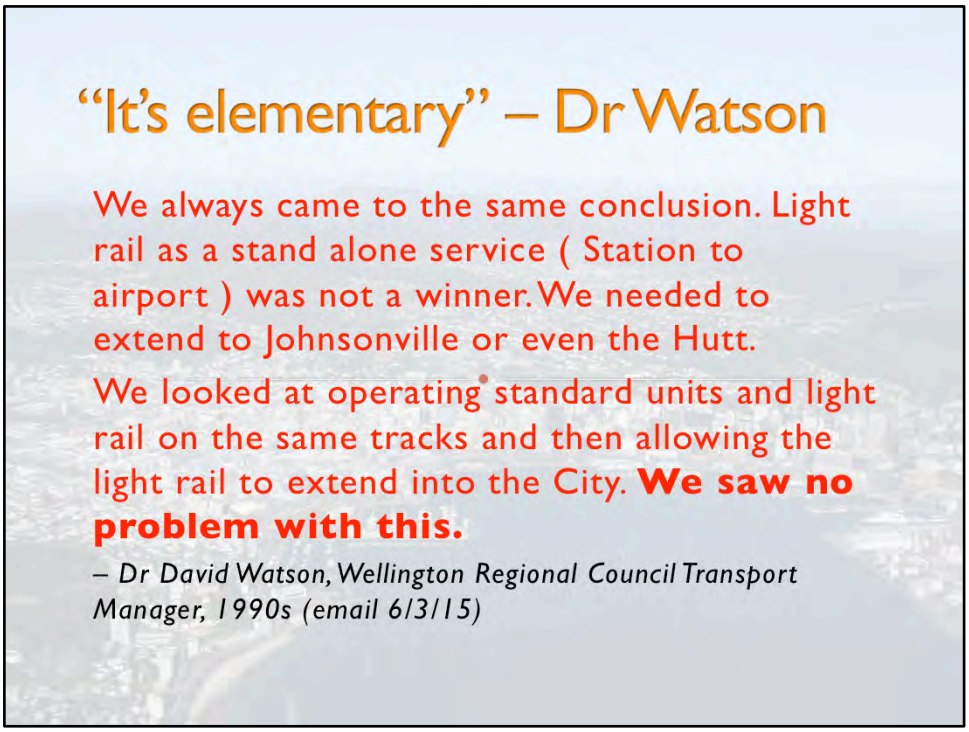


It is particularly bizarre that we remain one of the very few cities in the world with a stub terminal on the edge of the CBD, forcing a congested single big interchange for all commuters.

It is absurd to suggest, though some do, that the current broken spine model symbolized on the left gives Wellington a more growth-capable public transport network than the through service on the right.

World experience suggests that completing the rail system with a through-CBD city rail link is likely to increase rail spine patronage by 100%, just as is anticipated in Auckland.

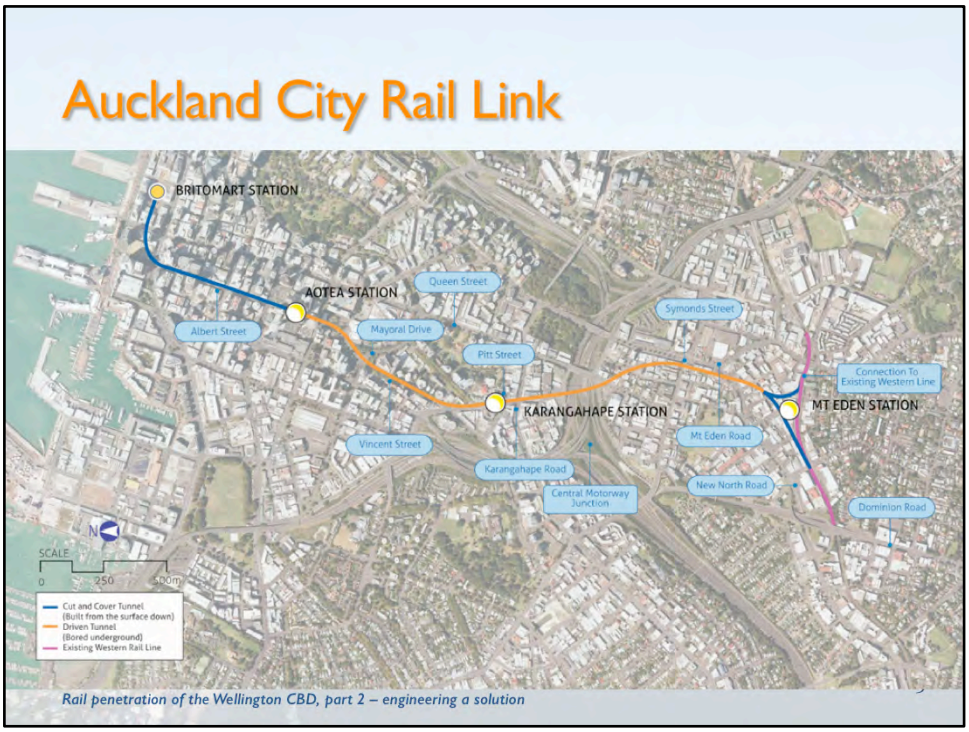
The Karlsruhe experience is instructive because its tram-train system is similar to what was projected for Wellington in the 1999 Regional Land Transport Strategy. Local experience includes the 60% increase in the use of the Newlands bus route when it was extended to Courtenay Place from its previous Railway Station terminus. A similar result for the rail lines is almost guaranteed, with another 40% or so likely once the Hospital is reached.



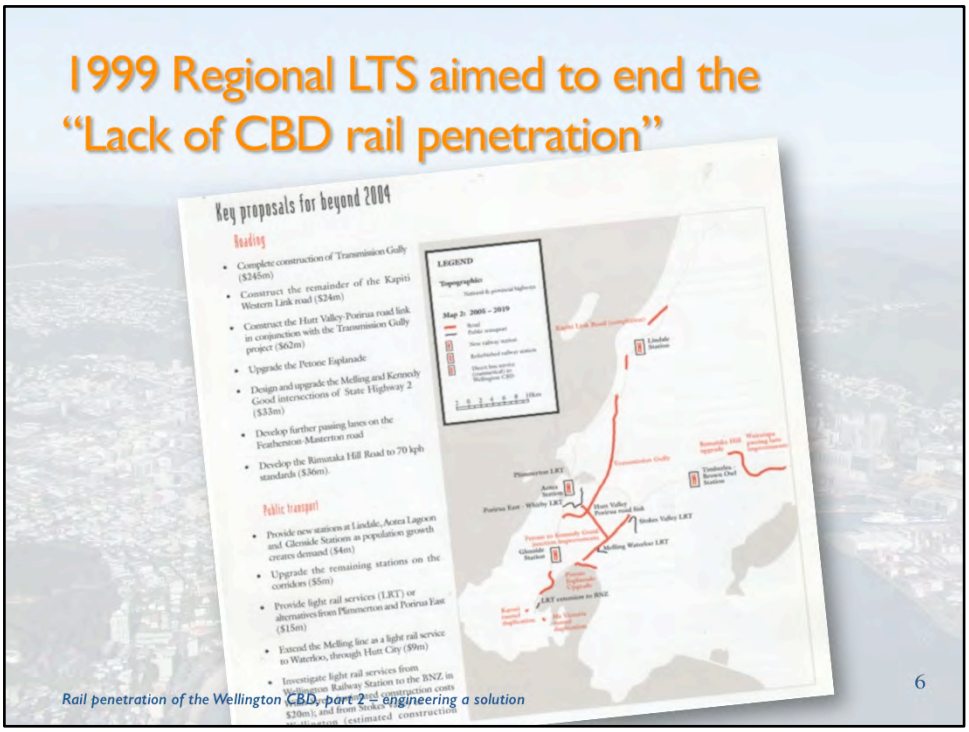
In the 1990s the Regional Council recognized the liability of the broken spine and worked towards overcoming it.

The council's former transport supremo, Dr David Watson, was particularly active in promoting ways to achieve rail penetration of the CBD.

The first attempt to fix the broken spine was in 1878, and got closest to realization, given that steam-hauled tram-train rollingstock was actually ordered for a Newtown to Lower Hutt service, but in the end went to Dunedin.



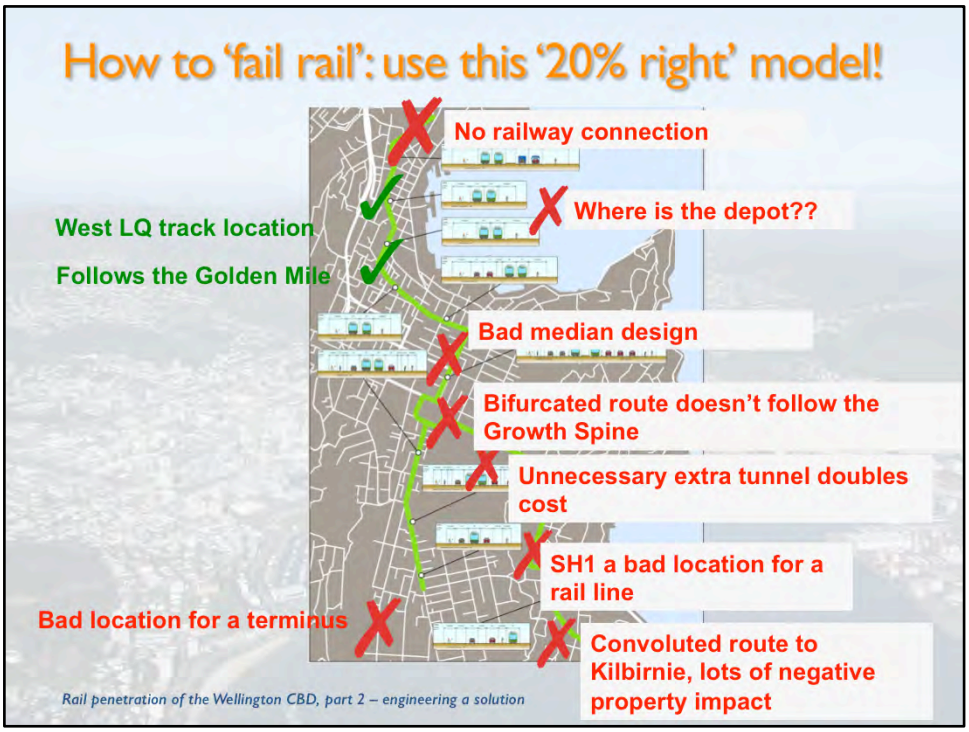
Contrast this with Auckland, where the need for a through-CBD rail link is the reason for the City Rail Link project, now under way.



The 1999 Regional Land Transport Strategy foreshadowed the extensive deployment of light rail in the 'long term' scenario.

As well as penetrating the Wellington CBD, light rail to Plimmerton, central Lower Hutt, Whitby and Stokes Valley was suggested for the 2004 – 19 period.

However, this was forgotten when 2004 rolled around. Instead the Matangi Mistake – specifying new rollingstock and renovated infrastructure in heavy-rail-only format – was made.

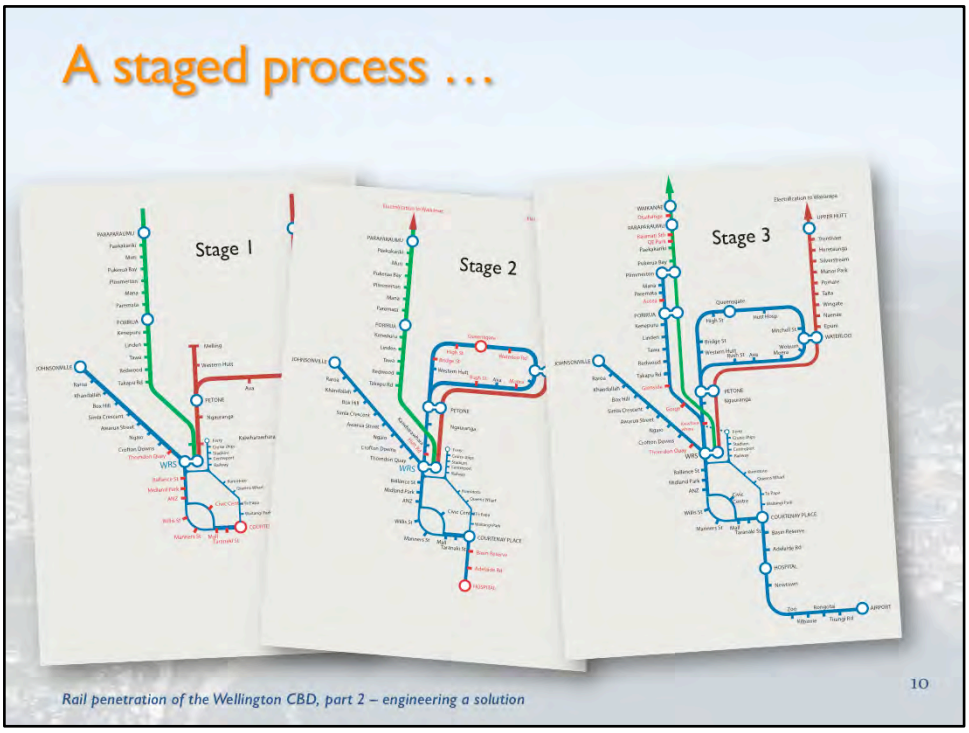


Unlike all the previous studies, the latest Wellington study which allegedly 'looked at' light rail, the Public Transport Spine Study in 2012/13, was, I believe, deliberately framed to 'fail rail' so as not to impede the massive roading projects then under development. It can justly be called the 'BRT Blunder'.

It ignored the 1990s light rail investigations and denied any need to provide 75% of the metropolitan population with a downtown rail connection, the first objective of any urban rail transit system. In fact, for the first time ever, the rail network wasn't even acknowledged as being a transport spine!

Since 1878 there have been many attempts and proposals for achieving rail penetration of the Wellington CBD, the most advanced of which was an underground railway planned in 1963.

Since the failure of the underground railway plan in the 1970s, light rail, sharing existing mainline rail tracks where necessary, has been the assumed model for extending rail through the Wellington CBD. A joint Regional Council/Railways plan for this was announced in 1993 by Dr Watson.



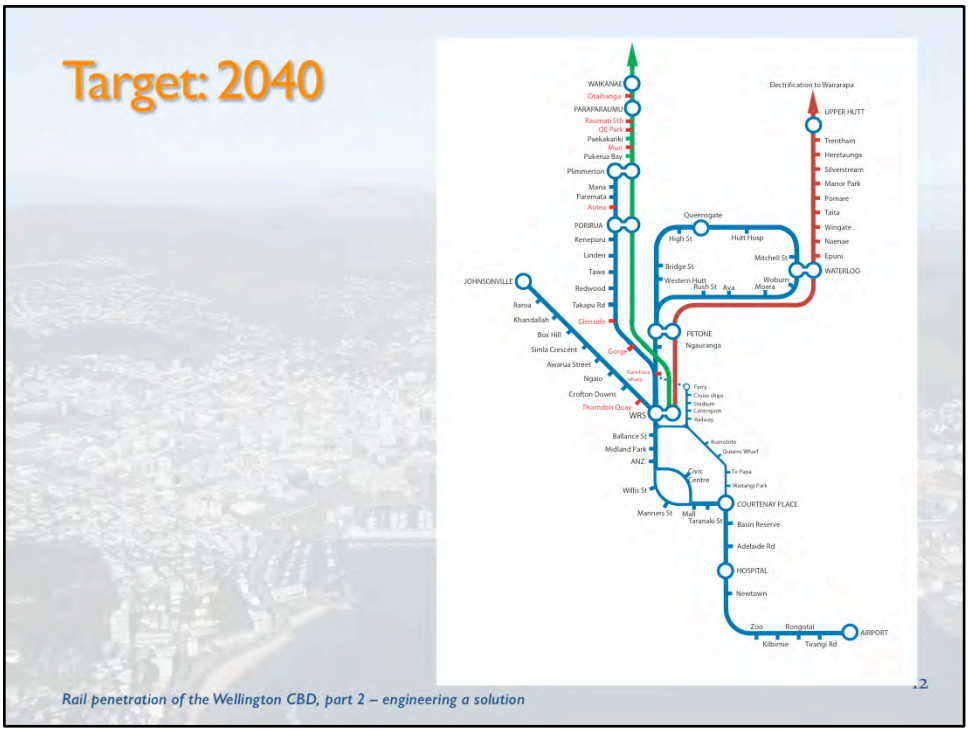
This model, now called tram-train, or the Karlsruhe Model, after the small German city where it has been developed most extensively, would provide a complete rail transit system for the whole region in affordable stages.

Affordable, in the sense that for a region a third of Auckland's population, the equivalent downtown portion of the Wellington City Rail Link would cost about 5% of the Auckland City Rail Link. And the total system linking to Lower Hutt, the Airport, etc, would be done in smaller, more easily funded, stages.

When fully realised, Auckland's total rail investment will be at least 10 billion. Wellington's equivalent, as envisaged in the 1990s plans, would be about 1 billion.

Using the studies done in the 1990s, and inspiration from the burgeoning use of light rail internationally, let's have a look at a default design of light rail morphing in stages into tram-train, so that Wellington will at last have a complete rail system which would attract commuters to public transport off the state highways and be relevant to most of the regional population.

This is looking only at the Wellington CBD-and-south line, but a Lower Hutt CBD light rail connection through the region's second main centre was part of the 1999 proposal and would be complementary.



The idea is to have a rail network spine which will function as per this schematic. It shows a hybrid system with some Matangis still in service on the green and red lines.

Beyond 2040, a 100% tram-train system after the last Matangis are retired would be an expected outcome.

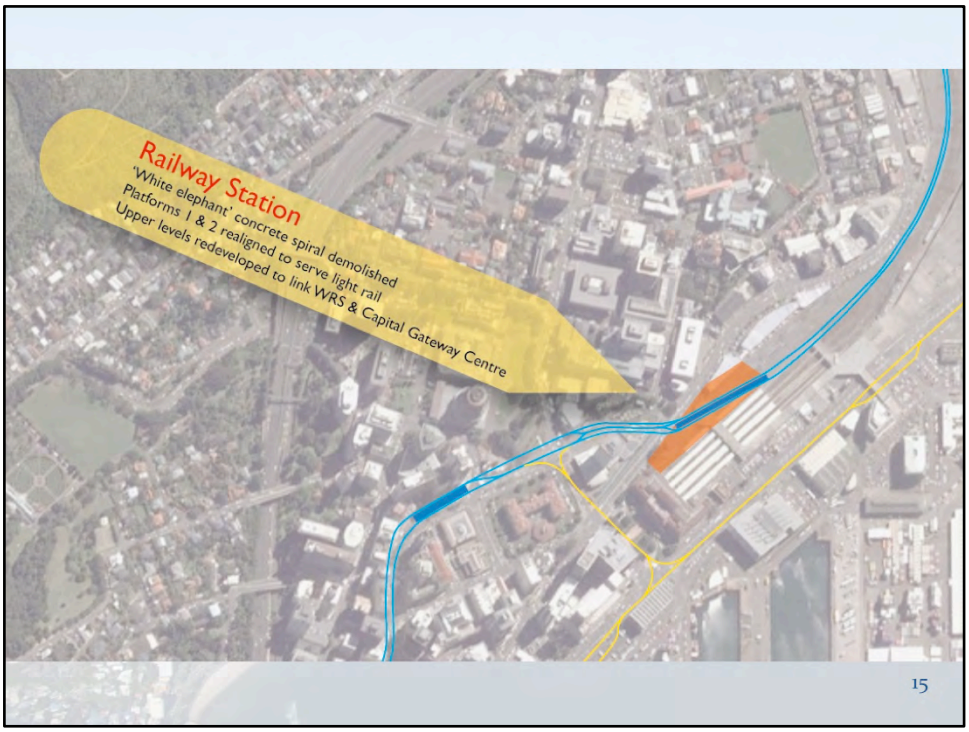
One thing that international comparisons prove is that a light rail route via the Golden Mile would have ample capacity to serve as the downtown end of the regional rail system.

For example, Melbourne's Bourke St, including a pedestrian mall, carries TWO tram routes, EACH of which carries more passengers than the entire Wellington rail network in its present form. (Route 86 and 96 each carries 15.5 M passengers/year, compared with Wellington Metlink's total of 11 M

This is despite Bourke St having more impediments to tram traffic, in the form of more traffic signals without tram priority, compared with the Golden Mile.

We start with Wellington Railway Station.

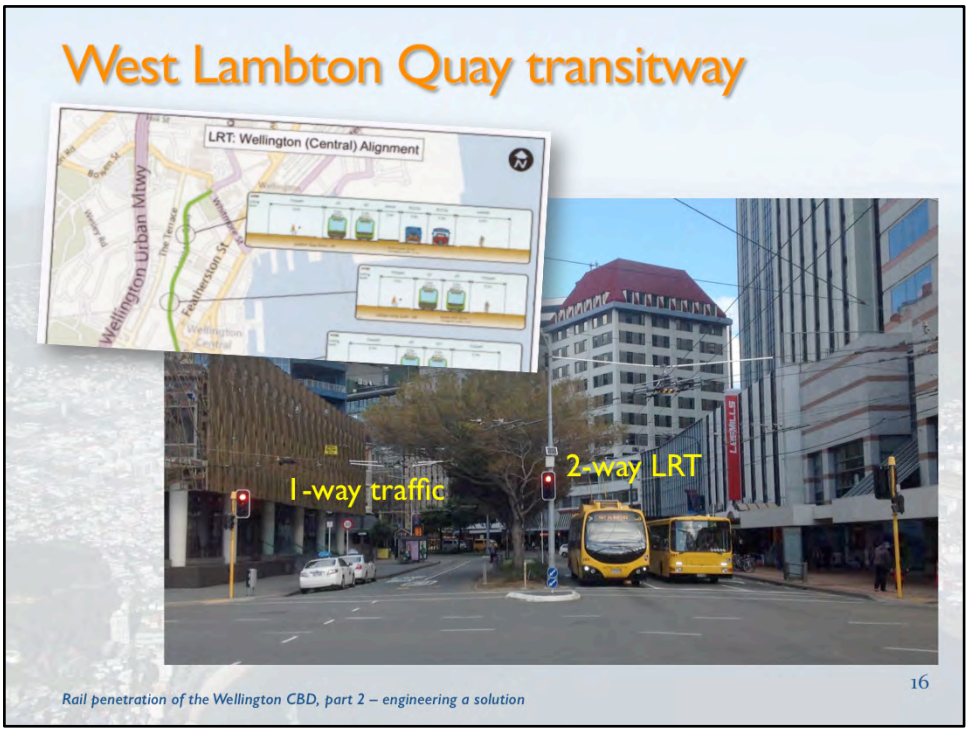
Our present model – one big interchange, with a long walk and wait for many different bus routes – or more likely jousting with the traffic to reach your place of work – is the very worst way to organise a public transport network.



Even if a first stage was to be just a street tramway with no revenue running on heavy rail, there are huge convenience, access, and future opportunity advantages to having the light rail platforms within the same array of platforms, on the same level, as heavy rail.

This is done routinely throughout the world. Of the systems I have visited, Los Angeles, Dallas, San Diego and Manchester Victoria are all arranged this way. It also makes future expansion on the existing network, and depot access, easy.

Demolishing the white elephant concrete spiral and instead developing some of the most valuable real estate in Wellington on the west side of the station is the obvious way to go. This would include new platforms 1 and 2 for the light rail.



From there it is a simple matter to lead the tracks through the existing bus parking area and down the west side of Lambton Quay.

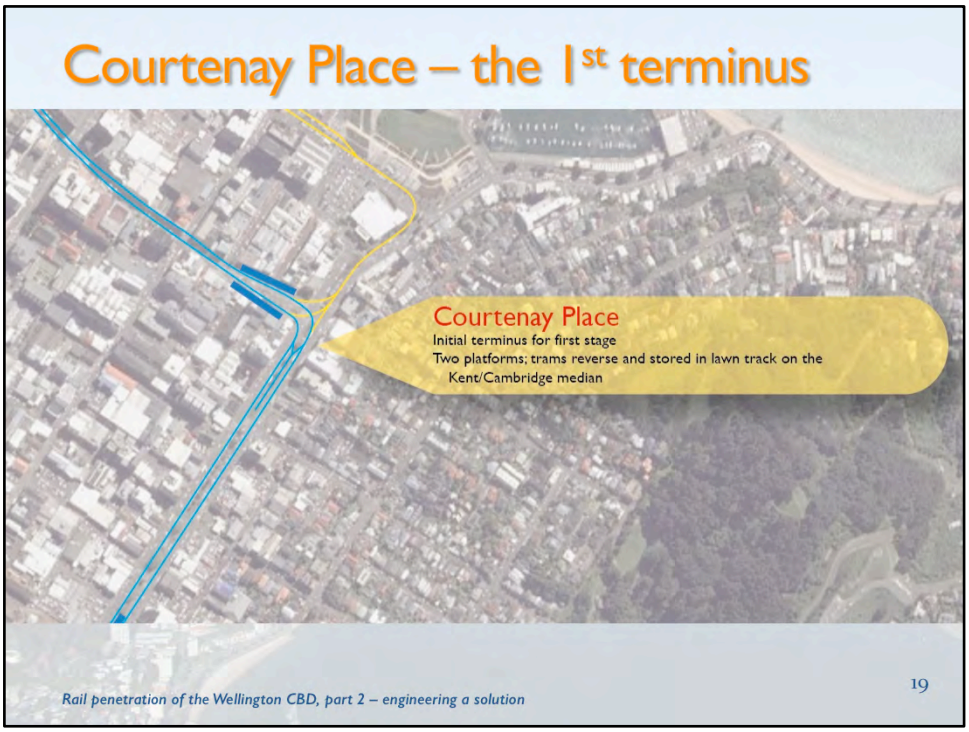
This is one of the few theoretical light rail design features that the Spine Study got right, but the idea is obvious and has been around for a long time. It would enable several traffic signals to be dispensed with and would be an ideal facility for a substantially pedestrianised Quay.

Any road vehicles still entering Lambton Quay would do so via one-way round-the-block loops fed from Featherston St. Without frequent cross-streets to worry about, tram-trains as long as two Matangi sets would be quite feasible.

At Hunter St the directions would separate as the buses do now. The 1995 Works/ MVA report recommended southbound trams travelling via Victoria St and showed this on the cover of the document. As with the buses, northbound trams would travel via Manners and Willis Streets.

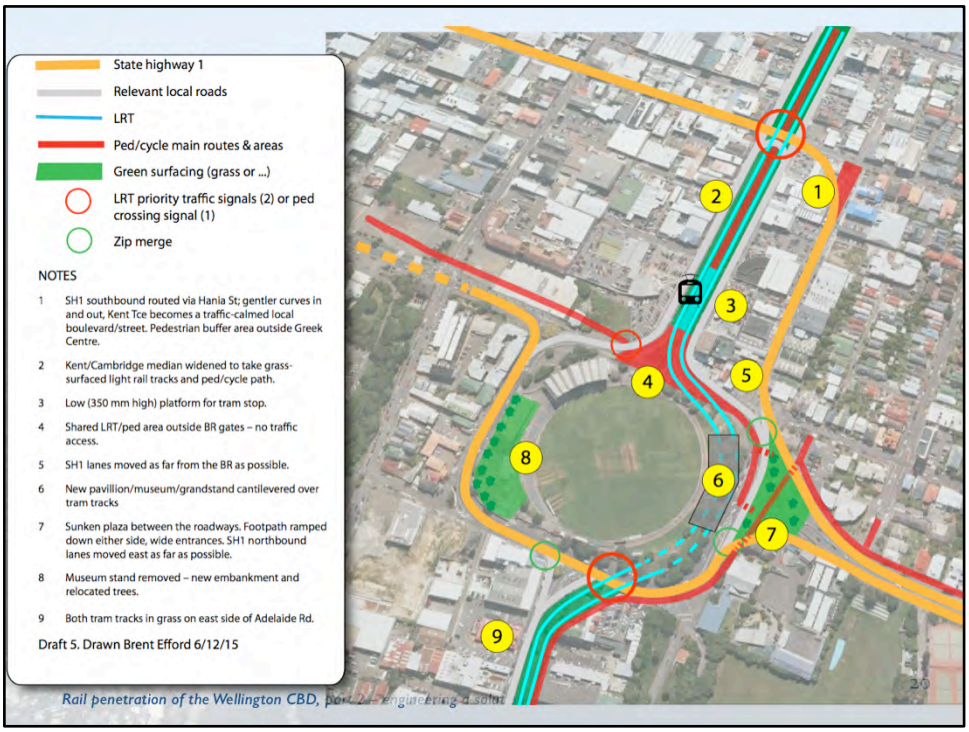
The two directions would reunite in Manners Mall, which could become a pedestrian mall again, with trams added.

Light rail is very suitable for this shared-space arrangement. It is commonplace overseas, like Manchester's Picadilly Gardens, Bourke St in Melbourne, or even for much of the length of the Christchurch Tramway. Remaining inner-city bus services would be routed down other streets.



From Manners St to Courtenay Place the road widens, and there is room for a station, maybe an interim terminus, while still retaining some other vehicle access.

Reversing and stabling should take place in the wide median around the corner.



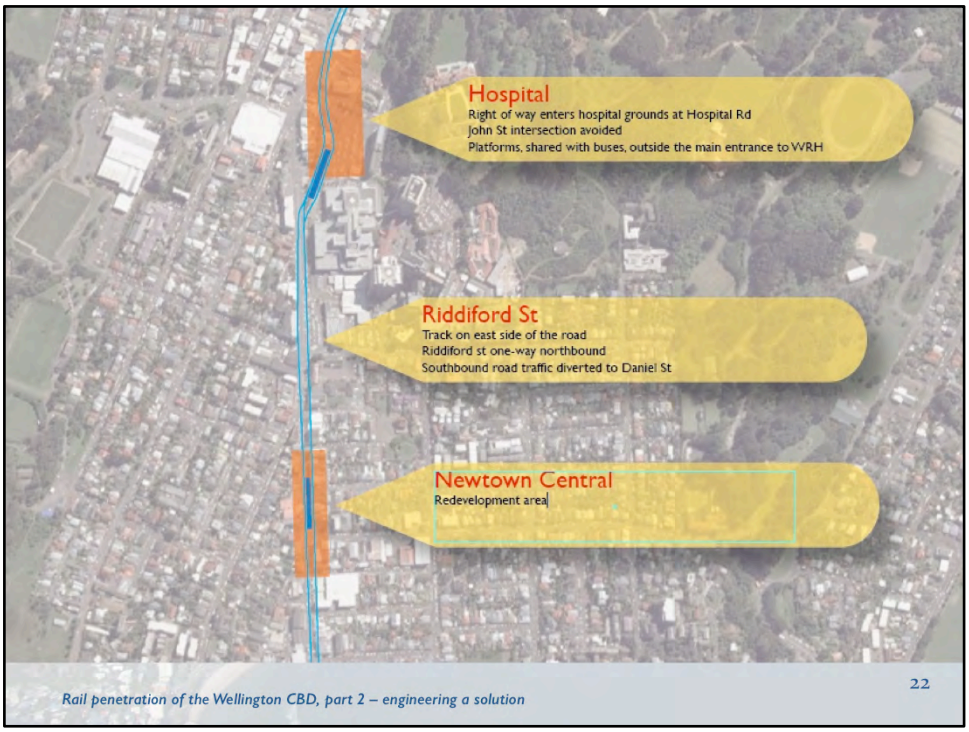
Between Courtenay Place and the Hospital, the line would cross State Highway 1, but only at right angles at prioritized signals.

Southbound SH1 traffic should be redirected into Hania St, a three-lane-wide street already dominated by the motor trade. This gets the state highway lanes further away from the Basin Reserve. There would be gentler turns for road traffic and most importantly, the old Canal Reserve – Kent and Cambridge Terraces – could revert to its intended role of a linear park or boulevard.

Here light rail would shine, because the tracks would be surfaced with grass and landscaped to blend in with the rest of a very wide median, which would also feature trees and a cycle and walk way.

The tracks would pass the Basin Reserve in a sweeping curve concentric with the cricket oval. The embankment or, I would suggest, a stand or pavilion could be cantilevered over the tracks.

From the Basin to Hospital Road a grass-paved right of way on the east side of Adelaide Road, using the road-widening margin already in existence, should be quite straightforward.



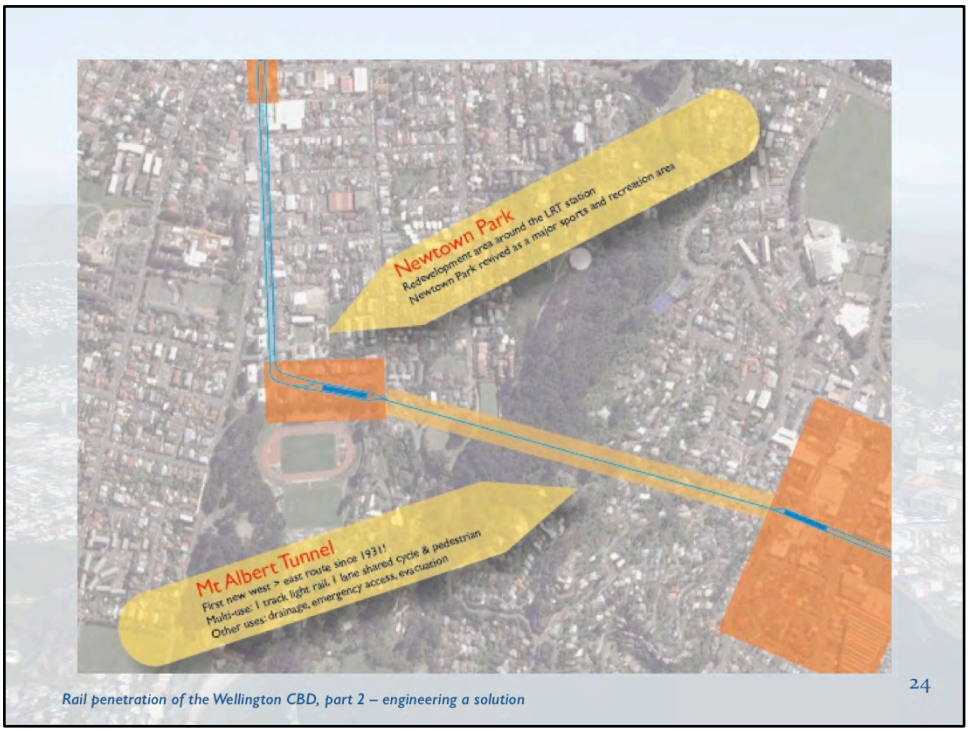
The tram line can avoid the John St/Adelaide Rd/Riddiford St intersection entirely by using the area between the existing old shops and the Cancer Centre.

This section would end up in a station in front of the main entrance to the Hospital which would include platforms shared with buses. That would be a logical interim terminus in a staged rollout of light rail.

Extending further south, through Newtown we start getting into some bigger engineering challenges. To provide an exclusive right of way for public transport through the dense shopping area, the southbound traffic lane in Riddiford St and the associated parking lane has to be used. The area should be partly pedestrianised, with through traffic diverted into parallel streets.

Having reached the shops we face the issue of extending to Kilbirnie. Remember that we are sticking to a single rail spine, not indulging in a stupid and deliberately dysfunctional second line via Mt Victoria, as theorized in the Spine Study.

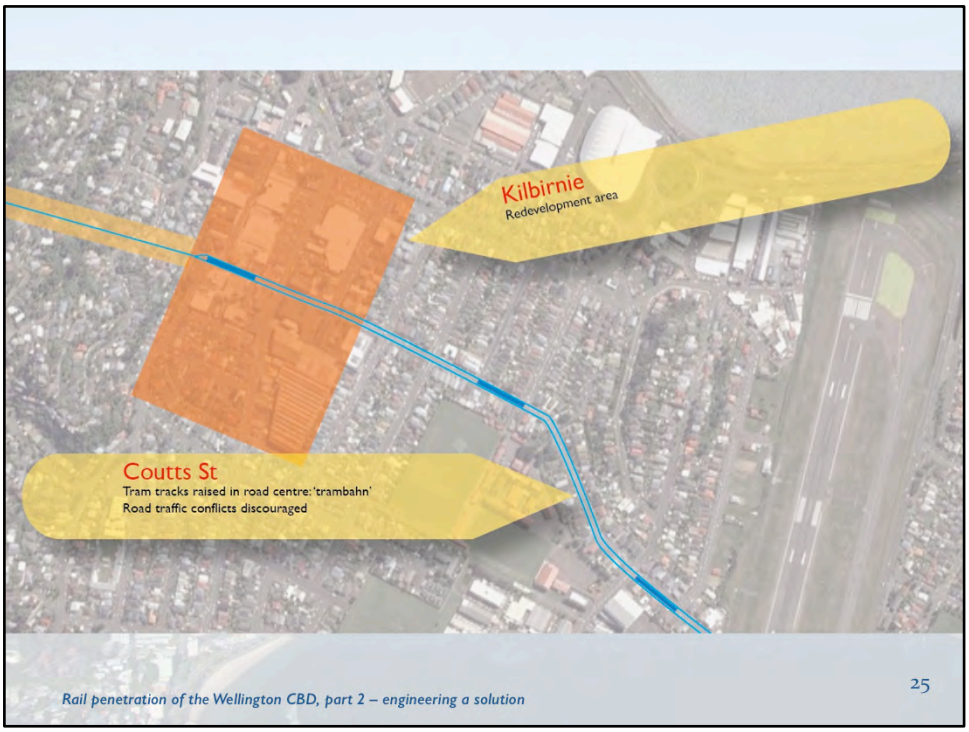
Some have been pushing for the Constable Connection, using the old tram route via Crawford Road, opened in 1915. However that winding and steep route, with significant extra problems once the line gets to the Kilbirnie Shops, is by no means the best solution.



The answer was proposed in our 1992 Superlink proposal: a Mt Albert Tunnel for trams from the Zoo to Coutts St. This tunnel of about 800 metres on a 4% grade could contain a single-track tram line with walking and cycling beside it.

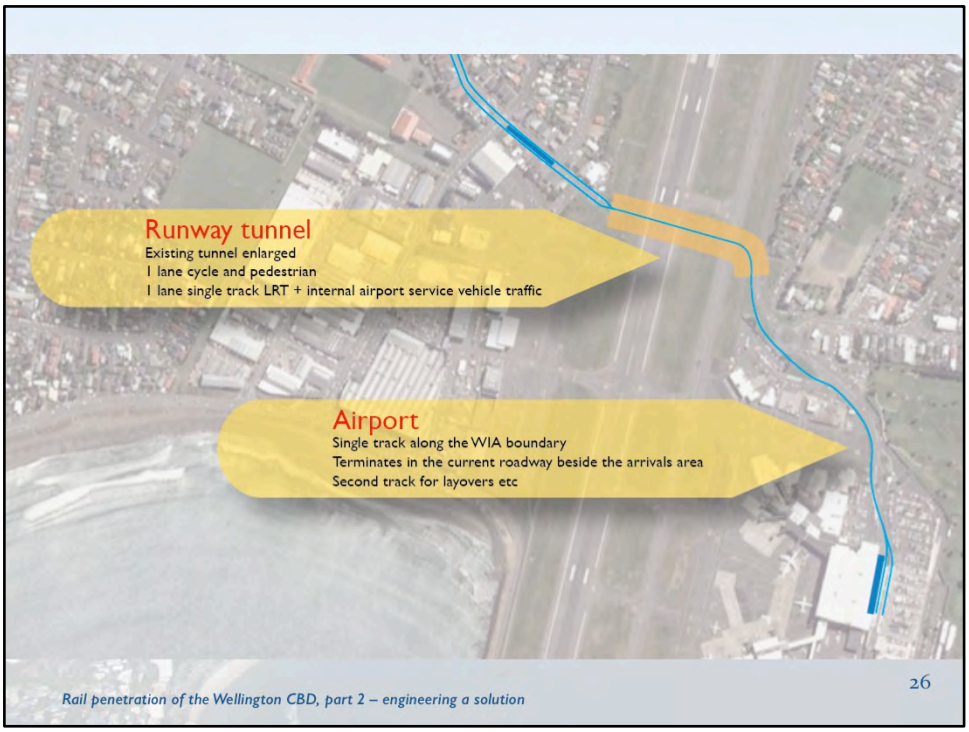
Not only does this tunnel – unlike the 2nd Mt Vic tunnel plan – route eastern suburbs public transport well away from conflict with state highway traffic, it also keeps all the big traffic centres on a single line – and that line has few restrictive curves and would provide speedy access to the Airport.

For the first time since 1907 it would provide a transport link not configured to facilitate motor traffic, and for the first time ever would facilitate all non-motor modes.



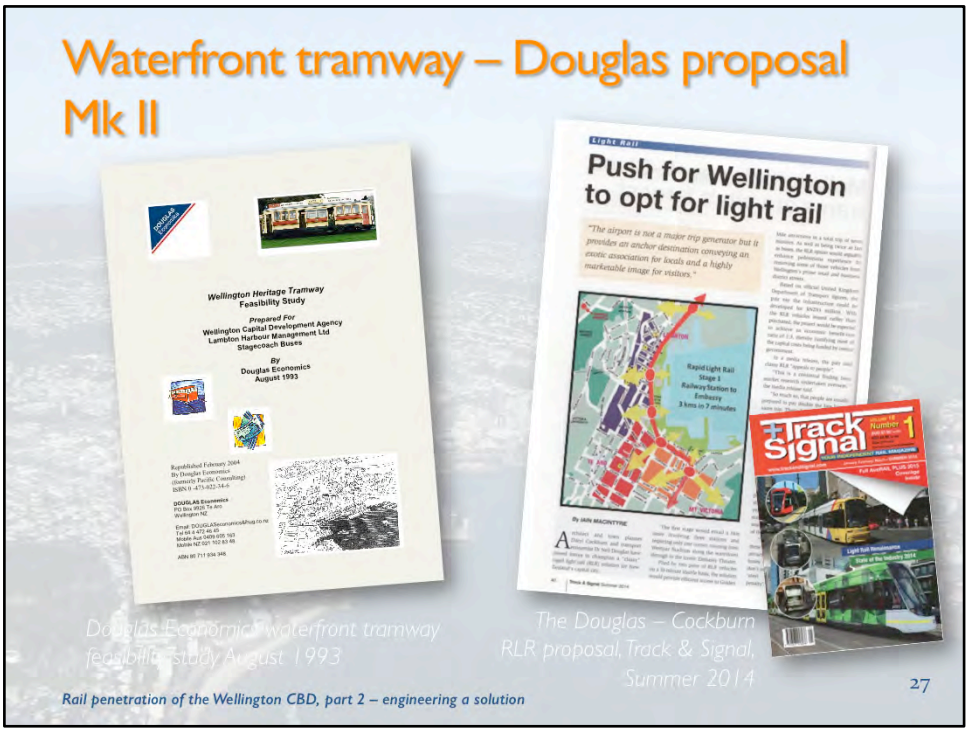
In Kilbirnie, Coutts St – the original tram route to the peninsula – provides a very direct route to the Airport, down a street wide and quiet enough to be suitable for mixing tram and local motor traffic.

The introduction of the Mt Albert Tunnel would enable Kilbirnie to densify and develop as a major regional sub-centre without necessitating further traffic growth.



Finally, to get to the Airport, it is a matter of expanding the existing pedestrian and cycle tunnel under the runway to take both trams and airport service vehicles, which could be advantageous for the Airport's internal operations, so it is a concept that the Airport Company should embrace.

A single track along the airport boundary beside the end of SH1 leads to the arrivals hall, the logical terminus.



What about the waterfront, where a heritage tramway like Christchurch's was started in 1995 and where there has been an explosion in activity and travel demand since. How would that fit into a light rail or tram-train scenario?

Wellington came close to implementing such a tramway in the mid-1990s after a 1993 study by Dr Neil Douglas. It was proposed to share Golden Mile tracks with the regional tram-train system.

Since then, the list of potential uses for a circulator including the Golden Mile and the waterfront has expanded enormously – the projected convention centre and movie museum is just another traffic-generator on the route which has arisen since the original 1993 proposal. So adding a waterfront line to the main light rail spine is the proverbial no brainer.

Dr Douglas proposed such a line again in 2014.

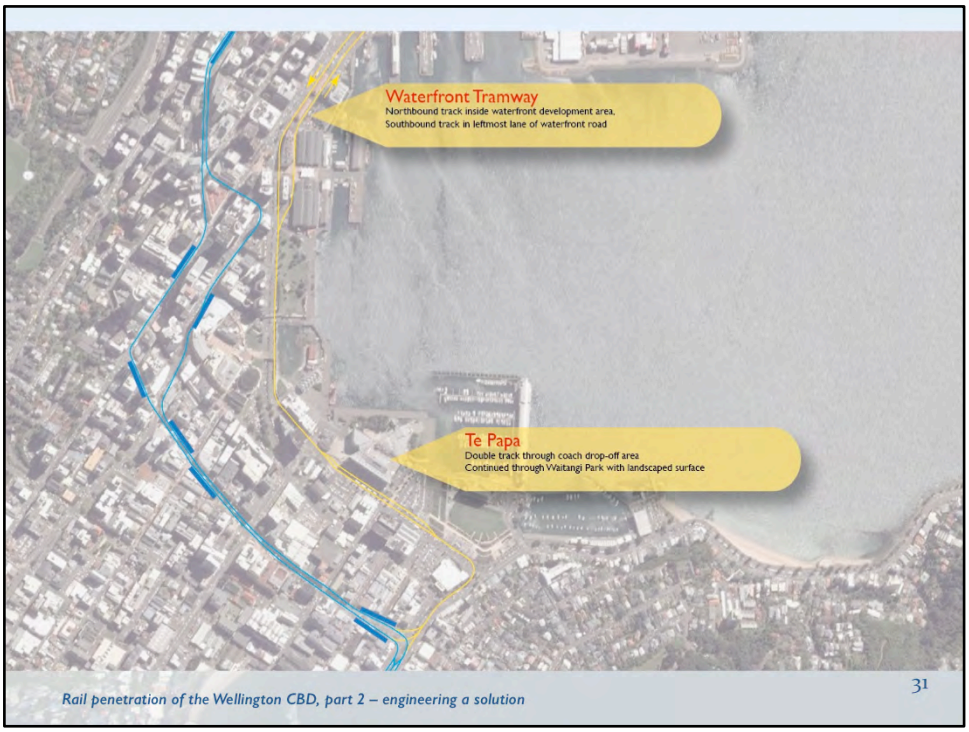
An emerging trend in America is towards shorter, slower trams acting as downtown circulators – Americans call them streetcars – to complement light rail running fast out into the suburbs on exclusive tracks. It is an ideal concept for compact Wellington.

A single-track tramway from the Interislander terminal south along the waterfront would be very easy to engineer. A rail line still exists along Aotea Quay as far as the Centreport office park. Until recently it ended opposite the Railway Station.

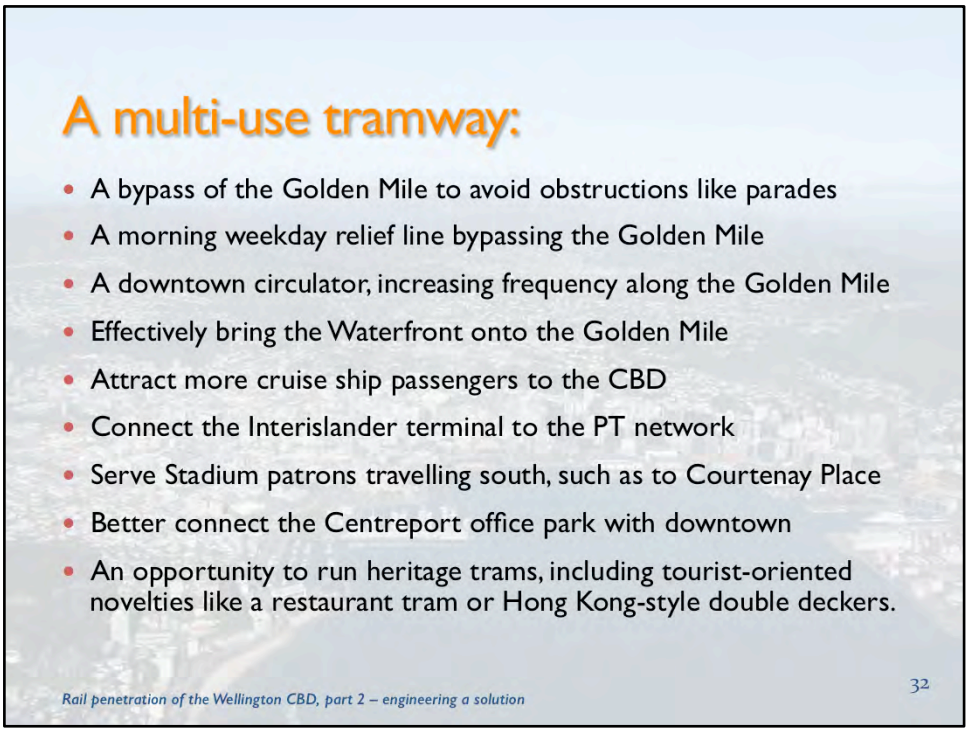
Reinstating the rail line as far south as Bunny St would be easy.

From Bunny St to Courtenay Place, a southbound track in the leftmost traffic lane would be on the line of the old Te Aro Branch.

A northbound track would fit inside the waterfront, where a clear right of way used by road vehicles exists from Frank Kitts Park to the Bluebridge terminal.



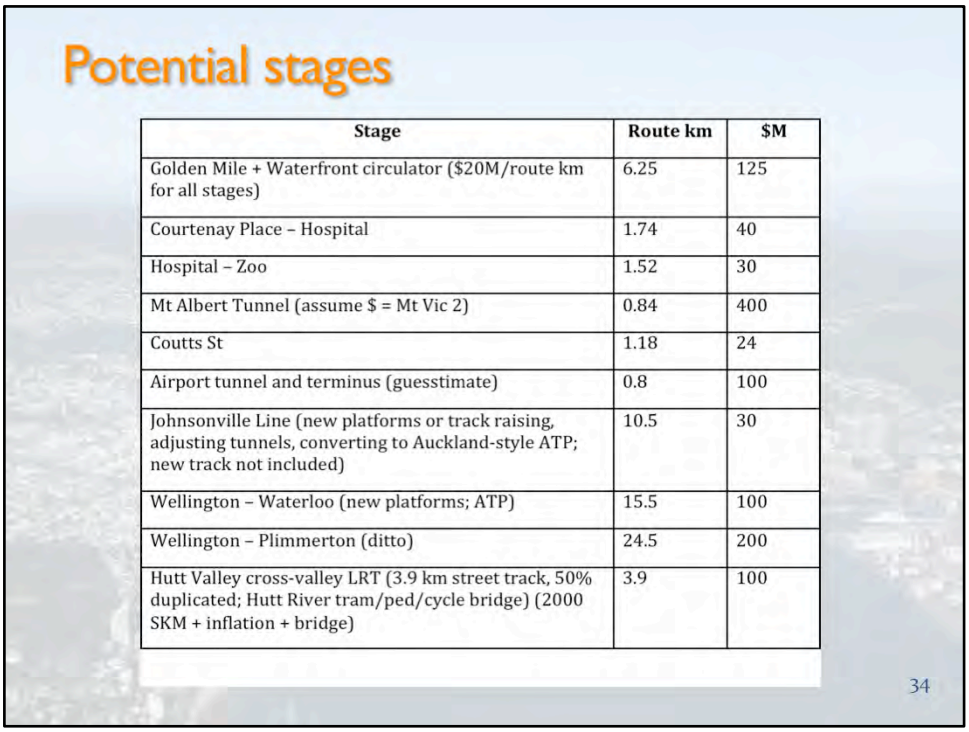
It would hop inside the waterfront land outside Te Papa and loop back to Courtenay Place to join the line down the Golden Mile.



Such a waterfront addition would serve many purposes:

- A bypass of the Golden Mile to avoid obstructions like parades
- A morning weekday relief line bypassing the Golden Mile, completely eliminating any doubts about the capacity of tram-train to cope with the peak of the peak
- A downtown circulator, increasing frequency along the Golden Mile
- Service the increasing number of cruise ships. Consider the economic spinoffs of a regular tram to Lambton Quay right where the ships tie up.
- Connect the Interislander terminal to the PT network
- Serve Stadium patrons travelling south, such as to Courtenay Place, more efficiently than the current long walk to the bus terminus
- Better connect the Centreport office park with downtown

An opportunity to run heritage trams, as does the F Line in San Francisco, including tourist-oriented novelties like a restaurant tram or Hong Kong-style double deckers.



The meme that light rail is 'too expensive' has been assiduously promoted by a highway lobby terrified that spending on rail will further weaken the case for funding their own enormously costly projects. When those projects are a billion apiece, or three billion when paid for over 25 years, such anxieties are understandable.

Local politicians unthinkingly accept this 'unaffordability' meme and are happy to settle for a crippled public transport system without that first essential: an unbroken rail spine.

The good news is that with the existing rail system and the EMU depot already in place to start from, light rail is stageable, built in chunks generally cheaper than the mammoth highway projects.

How the chunks are staged will depend on many things: the lifetime of the Matangis and how quickly it is feasible to replace them, the political support for moving state highway traffic to rail, and the priority given to inner-city access and mobility being but three factors.

Christchurch track construction – Easter 2010 – $5,000/metre

Christchurch Tramway experience is that street trackage will cost about $5,000 per single track metre to build. And that is for track which has survived the ultimate stress test.

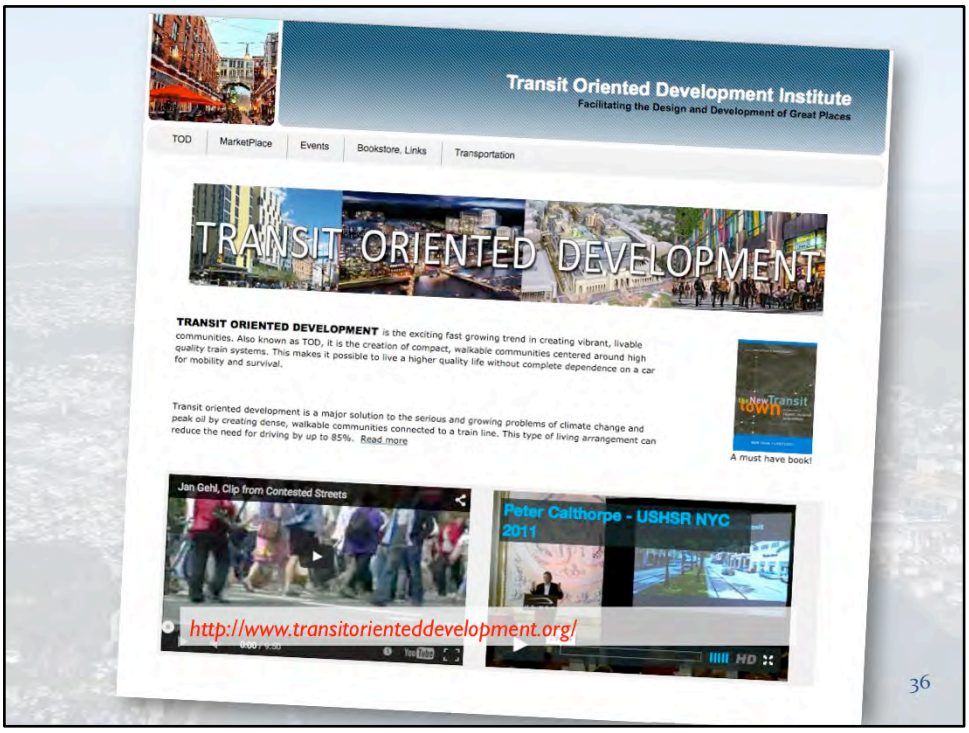
Double that figure to allow for utilities diversion and traffic engineering, $20M per double track km is a good budget ballpark.

Which compares very favourably with urban arterial highways of equivalent capacity. Add another $20M for access to the EMU depot, and the complexities of a Courtenay Place interim terminus and an inner-city starter shuttle line infrastructure for $70M is feasible – exactly what was predicted by Works/MVA in 1995.

Add the Waterfront line for another $76M and a downtown circulator track is complete for $125M.

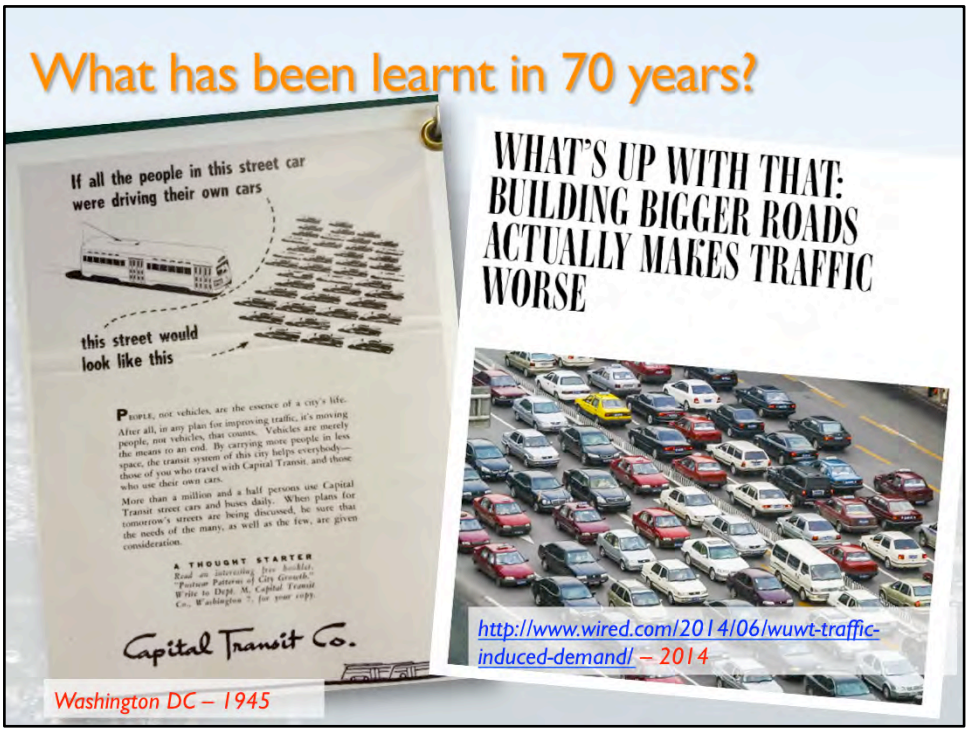
The big property development on the western side of the Railway Station is not included in this – that is a commercial opportunity which should be self-supporting. Just like the new development opposite Britomart which is starting the Auckland CRL

Nor is rollingstock included. Trams are expensive in themselves but carry more and last three times as long as buses and so cost about the same on a per passenger km per year basis.

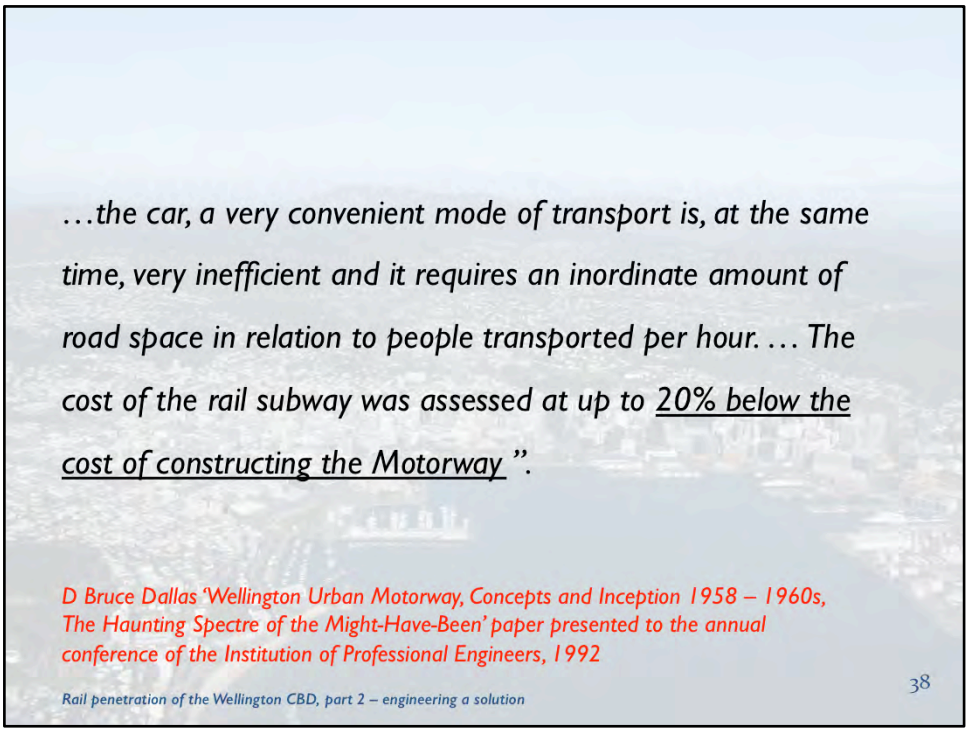


Note the potential for commercial property co-development – particularly at the Railway Station, southern Newtown and the Airport. Financing through value capture, PPPs, transit-oriented development etc, – already underway for the Auckland City Rail Link – is commonplace overseas.

The developmental spinoffs of light rail mean that private investment is often part of the package. Such sustainable infrastructure is a very attractive – and appropriate – investment for superannuation funds.

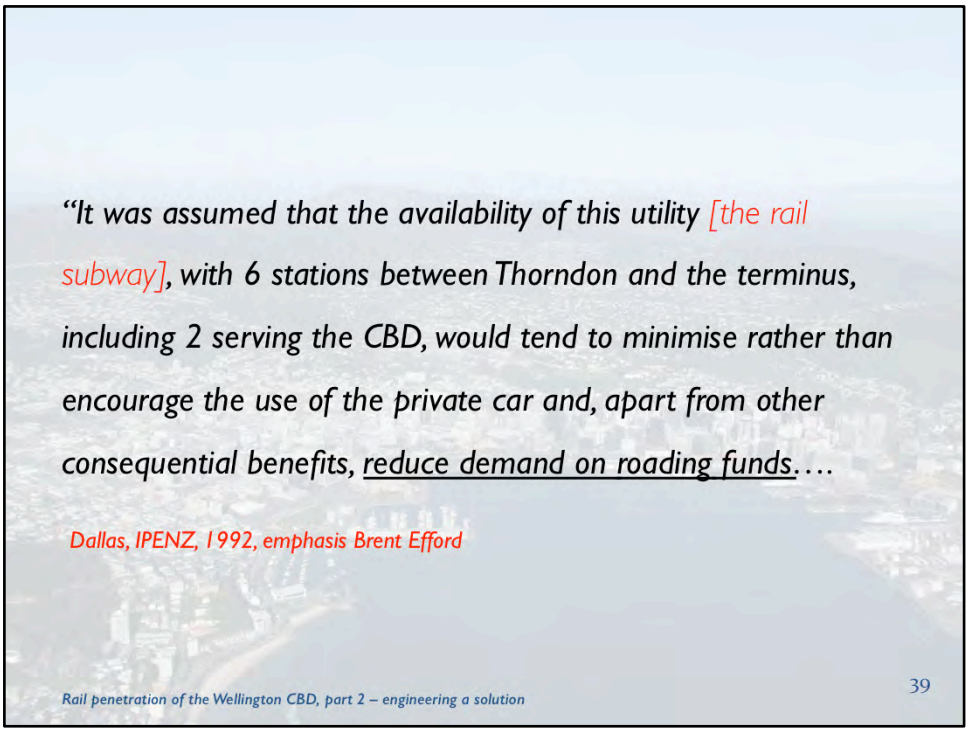


Unlike the big road projects, where the network effect simply induces more traffic – something we have known for 70 years – the effect of rail investment will be to reduce the demand on the road network, provide choices for faster travel between a multiplicity of busy destinations in a single corridor, and moderate the impact of road traffic on a central city which is very poorly placed to accept any more.



As Bruce Dallas, the designer of the Wellington urban motorway and the underground railway in 1959, suggested, expenditure on rail with its high people-moving capacity can also be used to lessen the demand for road building.

Which should improve economic efficiency: rail can deliver more people-moving capacity per million dollars of investment or operating expense, compared with motorways and car commuting.



But most importantly, investment in a Wellington City Rail Link is an investment in urban sprawl reduction, in city liveability and in climate change adaptation and mitigation.

Learn more …

- Subscribe to the free KiwiTram emailed PDF newsletter – just email 'subscribe' to brent.efford@techmedia.co.nz
- Tram-Train: how it works – presentation by Rob Martin, Wednesday 14 December 2016, 7.30 pm, Aro Valley Community Centre, 48 Aro St.