

# Infrastructure

## NZ Incs to invest?

Minister backs independent agency to deal with infrastructure

Fran O'Sullivan

Infrastructure Minister Shane Jones is plugging for greater investment by the "NZ Incs" – the New Zealand Super Fund, ACC, KiwiSaver Funds and major iwi – in public infrastructure, and the creation of an independent standalone agency to accelerate progress.

"As the Infrastructure Minister, I've got a strong feeling that as we've increased the amount of dough going to the Cullen Fund, I think there's a stronger case for NZ Inc investment in this field," Jones said.

"If we can use the pools of cash from ACC, KiwiSaver and the Cullen Fund I'll do it tomorrow. It's just a matter of how do you stay on the right ideological side of the line of privatisation while still using the innovation of the private sector? It's work in progress."

Since the 2008 Global Financial Crisis, New Zealand's population has grown by around half a million people – half of which was during the last three years. This has increased national demand for roads and passenger transport, particularly in Auckland, as well as more housing to accommodate the surge in population, schools, hospitals and even prisons, along with more commercial buildings.

At this stage the country just can't keep up. With Finance Minister Grant Robertson keen to keep NZ within the targets he has set for reducing Crown debt, and much of local Government facing funding constraints, new options are needed.

Infrastructure New Zealand has led the debate. There is now a growing consensus that when it comes to public



Shane Jones says as Infrastructure Minister, he has a mandate to be innovative.

Photo / NZME

infrastructure, the Government should set up a standalone infrastructure agency. Jones is on-song: "Since I took on the portfolio I've been keen to move infrastructure out of Treasury and give it greater visibility in the form of a standalone agency.

"I've always felt that given that Jacinda (Ardern) gave me this role, there's no point holding it unless you're going to use it and try to deliver something that the industry and local government as well, has wanted."

The Infrastructure Minister has been pushing a paper through Cabinet and was hopeful that by the time he gets to speak to Infrastructure NZ's Building Nations Symposium in Auckland tomorrow, a preferred position will have been reached. "As an advocate for better treatment of infrastructure issues, I think it needs to be a standalone agency.

"That's what I've rooted for."

He stresses that using private capital to build New Zealand schools, hospitals or prisons is "off limits".

"In relation to what's the mix of funding for the other infrastructure projects, I've got a mandate to be innovative. Phil Twyford's already got Treasury doing work to help him with the construction-orientated infrastructure, and that's why I'm keen for this infrastructure body also to have a key role in innovating how the Crown outsources some capital obligations on these projects.

"Where do I think the bullet might bite? I would say obviously in the new infrastructure needed for KiwiBuild and the rollout of our 100,000 houses.

"So, you'd have to imagine with the new corridor Minister Twyford's exploring – the Hamilton-Auckland corridor – I've got a lot of sympathy for where he's heading in his thinking. We've already got the sunk costs of the

goldplated four lane highways, we already have a trunk line going through there. So, in terms of connectivity, we've got a lot of key assets that are legacy assets there.

"It's certainly got my backing to look at innovative infrastructure spending options to create contributing suburbs and contributing towns."

Jones stresses the standalone agency has to give confidence to industry and also local government and overseas participants. "I'm really keen for it to project a long-term pipeline of what we're going to fund and what at a local and national level of government is high on our agenda."

He contends that if there is an independent entity it will attract people who may not ordinarily want to work in the Ministry of Business, Innovation and Employment, Cabinet Ministers' offices, or Treasury.

"The upshot will be a blend of those

of us who understand the stewardship nature of the taxpayers' money and others who are a lot more innovative."

A trip to Australia in April to assess how that country deals with infrastructure projects convinced him he was on the right track. Both countries have already supported the creation of the Australia and New Zealand Infrastructure pipeline, which provides a forward view of public infrastructure activity across Australasia.

Part of the reason Jones went to Australia was to test the appetite of its players to invest here. "I would say most of them are donkey-deep in New South Wales. There was no one who was totally disinterested, but the siren call came when people recited the woes of Christchurch; they felt they got burnt off in Christchurch – they couldn't work out who would make a decision."

At issue is the parting of ways between the National Government and Plenary Conventions New Zealand – a private consortium made up of Australian-based firm Plenary Group, Christchurch's Carter Group and Ngai Tahu Property – over the Christchurch Convention Centre. "Plenary told me how gutted they were by the Christchurch experience and advised me if you want trans-Tasman development in this field, learn the lessons of Christchurch – or just go to the rugby league and enjoy your trip to Australia."

Jones says there will be an incredible body of work for the new agency to sink its teeth into. "So I've had to be upfront. But if you're asking 'is refined procurement approach a part of the agenda or the writ of this organisation?', the answer is yes.

"Will it radiate its influence to the silos of government? Absolutely yes. I don't think it's credible for the agency to totally eclipse what education and health are doing, but I've been mightily supported by senior ministers in those fields to proceed with such an agency to better guide both the delivery and architecture of a programme and the necessary contracts."

## Model for the future should involve sharing the risk

Fletcher Building chief executive Ross Taylor says it's encouraging to see the Government engaging with the construction industry and the companies that work on the larger projects to understand the present issues and work together to develop a sustainable way forward.

"This is important for the industry but equally important for New Zealand, if the country wants to keep a vibrant, robust domestic industry that can deliver medium to larger projects."

That sustainable way forward could see Government demanding that industry invests more in building up the construction workforce in return for greater certainty.

Cabinet Ministers last week met key industry players to discuss major difficulties affecting them during a boomtime when even the country's largest construction firms have found business difficult.

Infrastructure Minister Shane Jones says a lot of firms are in a parlous state.



Ross Taylor

cycle of a project. They were very overt when they asked us to do that."

Since Mainzeal collapsed five years ago there has been considerable industry turmoil. Hawkins was snapped up by Bidner. Fletchers stepped away from bidding on new vertical construction projects after projected losses of around a billion dollars over two years, on prime buildings like the International Convention Centre in Auckland and the Christchurch Justice Precinct.

More recently, Ebert Construction went into liquidation.

"They are hanging out for the Crown to provide the necessary level of leadership that takes us to a spot that we can recover from the least-cost option and move towards the full economic life

cycle of a project. They were very overt when they asked us to do that."

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Jones makes clear the Government wants to see changes in the construction sector. "We no longer have the Fletchers of the world who have battalions of men and women and artisans and craftsmen and tradesmen and vocationally-orientated people."

He suggests the new model has arisen where big firms are progressively just project managers relying on labour hire providers.

"I'm really keen to see what the Government can do in terms of changing that model. It possibly may be zero, but then we do have a lot of power and influence over our procurement policies, and perhaps the (standalone) agency in the future can advise us on how procurement can fulfil those human capital outcomes."

A new procurement model which results in greater risk sharing is top of mind for the industry.

Says Taylor: "From a Fletcher Building perspective we are very interested in how this progresses as it is one of

the things that will inform our future decisions on what we do or don't do in the vertical construction space in New Zealand."

ANZ's Paul Goodwin notes that since Fletchers signalled some time ago they were pulling out of vertical infrastructure, the banking sector has started to see a bit more discipline from other construction firms as well.

"If you go back over the past couple of years, they were all bidding for everything at margins that would have been OK if they hadn't been taking on all the risk they were taking," explains Goodwin, who is managing director Institutional NZ for ANZ. "But they were taking all that risk with cost escalation and variations and what have you, and the whole thing has ended badly for quite a number of contracts."

"A number of firms are now starting to turn away things, so they are starting to exercise the same sort of discipline Fletchers did around their vertical construction business. I think it will be

forcing a shift in terms of how procurement or the developers are engaging with the construction firms."

"Projects come with all types of risk," adds Paul Buetow, Partner in Kensington Swan's Construction and Major Projects team. "Political risk as to whether a project will go ahead. Timing risk as to when it will be undertaken. There is also consenting risk, management of stakeholders and procurement risk – will the model that is going to be adopted be one that a contractor is prepared to entertain? And, of course, there is contract risk. Risk should lie with the party best able to manage it, but this is often not the case."

The recent reliance on novated contracts where, typically, construction firms have shouldered too much downside risk, is a major issue.

"I think certainly the Government's got a role to play here in terms of how they procure projects," says Goodwin.

continued on D10

# Affordable homes – we can build them

\$650,000 for a Kiwibuild is simply unaffordable for many New Zealanders

**Stephen Selwood** looks at what's needed to get build prices down.



**Infrastructure**  
**Stephen Selwood**

The Government's trademark KiwiBuild programme has kicked off, and with around 40,000 registrations of interest so far, it is clear it is delivering to an underlying need for more affordable housing in New Zealand. Almost 25,000 of these registrations have been in Auckland, which highlights how much pent-up demand there is in one of the world's least affordable cities.

However, we also know we are 50,000 homes short of what we need to house the Auckland population. That's not a guesstimate, but a well-conceived assessment from the Auckland Council.

Surely a KiwiBuild home is better than living in a garage or with Mum and Dad forever – why haven't these other 25,000 households put up their hand (not to mention more of the 200,000 households in Auckland who are renting)?

The answer is, of course, that at \$650,000, KiwiBuild homes are not yet affordable.

The council has shown that a family would together have to earn \$118,300 to afford the \$40k per annum mortgage repayments on such a home.

Only 40 per cent of Auckland households earn this much and most of them own their own home. So we have to do better. How much better?

In 1991, almost three quarters of Aucklanders owned their own home. If we were to deliver homes which three quarters of Aucklanders can afford, they would need to cost \$300,000.

This is what a truly affordable home is in Auckland.

How on earth do we do that?

It's easier than you might think.

Let's break down a home into its three core components: the building itself, the infrastructure (including consenting) and the land.

Starting with the building, it currently costs around \$2000/sq m to build a simple standalone home in Auckland. Apartments are more, say from \$2500-\$4000/sq m depending on how complex.



The Houston example shows a \$300,000 home is more than feasible

In 1991, almost three quarters of Aucklanders owned their own home.

If we were to deliver homes which three quarters of Aucklanders can afford, they would need to cost \$300,000.

This is what a truly affordable home is in Auckland.

That means a moderate 150sq m standalone home or a not-very-family-friendly 100sq m apartment will max out the \$300,000 limit of the bottom quartile.

So build costs have to come down. KiwiBuild will be a big asset in this regard. The scale at which KiwiBuild is being delivered is already attracting investment in off-site manufacturing, standardisation and much greater building efficiency.

Our target should be \$1200sq m, which would bring us more into line with overseas.

This means our 150sq m home will cost \$180,000, giving us \$120,000 for infrastructure and land.

Looking at land, KiwiBuild is interesting because the Government is targeting much redevelopment on Crown land, which is very difficult to value.

But we also know the Crown is buying from the market at market prices, which we can value.

To buy an old "quarter acre" section in Auckland – 1000sq m – today costs a million bucks. Obviously more if it's in Remuera and less if it's in Papakura, but that's a good approximation for the areas which are priorities for KiwiBuild.

If four homes replace the one, more or less as planned, the land costs \$250,000 per dwelling. This is double the \$120,000 available for our affordable home.

If we instead assume 10 units replace the one, land costs \$100,000 per unit, improving affordability.

But there are now two problems. Putting 10 units on 1000sq m will be complex and consenting and construction costs will increase. Instead of \$1200sq m to build, we're probably back to \$2000sq m (and the rest).

This means the dwelling size has to shrink, which in turn drives up the

per-metre cost to build. It also means things like car parking won't be available, so homes need excellent public transport.

However, public transport of this quality is only available in very central areas where land costs much, much more than 1000sq m.

This all kills the maths on a \$300,000 aspiration before we even get to the second problem – which is that the more dwellings there are, the more infrastructure you need.

As a very rough estimate, about \$100,000 per unit is needed for infrastructure and consenting a new home in Auckland.

So is the dream of actually affordable housing in Auckland dead then?

Thankfully not. As demonstrated by the Houston, Texas home in the picture, a \$300,000 home is more than feasible – but we do have to change how Auckland grows.

Affordable housing must be targeted on greenfield land, not expensive brownfield land.

Unzoned greenfield land around Auckland costs around \$25,000 for a 500sq m section – a tenth of a 250sq m section in a KiwiBuild priority area.

That's one major advantage. The other is that greenfield infrastructure costs six to nine times less than brownfield infrastructure.

Nimby objections, difficult consent conditions, traffic control, noise concerns, digging up concrete, avoiding other infrastructure and many more factors make retrofitting new developments in brownfield areas horrendously expensive.

Further, if we do what the folk in Houston do, we'd remove infrastructure obligations from Auckland Council and transfer them to a separate public entity.

That entity would roll out core water and roads by borrowing on its own balance sheet and repay debt with a long term rate.

Homes could cost up to \$100,000 less, though rates would be higher.

At \$25,000 for land, \$100,000 for infrastructure and \$1200sq m to build, we can build homes for a \$300,000 cost.

If we wrap the infrastructure costs into a long-term repayment, we're on track to have homes sold on the market for this amount.

This is what Aucklanders need, it's time we made it happen.

● *Stephen Selwood is Chief Executive of Infrastructure New Zealand*

## Inside



### Equity for infrastructure – D4, D6



### Call for confidence – D9



### Fletcher's new infrastructure GM – D11



### Women in infrastructure – D12-13



### Light rail on the move – D16-18



### Creating resilience – D19



### The age of autonomy – D24

## Strong line-up to discuss infrastructure challenges

Infrastructure NZ's annual Building Nations Symposium begins in Auckland today with 49 industry speakers lined up to address the nation's infrastructure challenges.

Prime Minister Jacinda Ardern and Ministers Phil Twyford, Grant Robertson, Shane Jones and Nanaia Mahuta will use the forum to announce policy directions, whilst National Party Leader Simon Bridges will set out National's view of the way forward.

Graham Stuart, MP for Investment from the United Kingdom along with the CEOs of the Australian infrastructure bodies, and a range of infrastructure experts from the United States and the UK will share international best practise with the record



**Jacinda Ardern**

breaking 600-strong audience.

The two-day conference covers multiple streams focusing on technology, transport funding, enabling growth, rail, water, governance, planning and funding, lifting capacity for the sector, and regional infrastructure development.

A broad mix of public and private sector leaders including Bill Cashmore, Deputy Mayor of Auckland; Fergus Gammie, Chief Executive NZ Transport Agency; Peter Reidy, Chief Executive KiwiRail; Tommy Parker, General Manager Infrastructure, Fletcher Construction and Adrienne Young-Cooper, Chair Housing NZ will all contribute to the debate.

Multiple panel discussions combined with online live polling will

tease out the views of the delegates, which will be collated into recommendations for a way forward, as the country grapples to ensure NZ's infrastructure is not just fit for purpose, but supports sustained improvement in the quality of life for all New Zealanders.

Profiling 41 industry sponsors, Building Nations provides extensive networking opportunities, including breakfasts for the Women in Infrastructure and Emerging Talent Young Leaders networks, a cocktail function, gala dinner and after match function. New Zealand's premier infrastructure event has grown from strength to strength, with the 2018 Symposium lining up to be the most influential to date.

## Infrastructure 2018

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# SPVs on the agenda



**Infrastructure Fran O'Sullivan**

**A**uckland's rapid population growth is posing challenges over paying for upgrading and upsizing infrastructure to support the growing city.

At first blush, it seems daft to question "What's not to like about Auckland's population growth which is forecast to increase from 1.65m currently to 1.95m by 2028?"

More people will lead to greater diversity. A more vibrant city, even (finally) an 'international-style city'. It will also spur economic growth. But along with greater population comes growth pangs as the Auckland Council seeks to fund an infrastructure gap.

**Funding gap**

The figures tell the story. Auckland Council's revenue from operating sources is forecast to grow from \$3.6b to \$5.7b over the 2018-2028 period in which Auckland is predicted to add another 300,000 people. Much of this lift will come from rates and water charges earned from the 120,000 new dwellings forecast to be built over the next 10 years. That's a clear financial upside. But as can be seen from council's revenue forecasts, there is a financial challenge to be overcome.

This challenge is seen in the gap between council's budgeted levels of capital expenditure and its forecast net operating cash surplus (or funds from operations).

Total capital expenditure is



**Matthew Walker**

budgeted at \$25.6b over the next 10 years while total funds from operations is forecast at \$12.4b.

This funding gap is concentrating minds in council and central government.

Auckland Council's Matthew Walker says Council recently signed off on a \$26b capital programme for the city over the next 10 years.

"But we know that many more capital projects are not currently funded through that programme," says Walker, who is acting group chief financial officer at Auckland Council.

He points to Auckland Transport's Regional Land Transport Plan which includes a list of over \$6b in projects which are currently unfunded.

"If council, working with central government, can identify and agree on new structures to support the

funding of infrastructure projects that don't require council to take a central role in financing or underwriting, we have an opportunity to respond to the city's infrastructure needs with more pace and certainty," he says.

**Debt Squeeze**

Though funding from central government through NZTA and developers through development contribution charges helps to close the \$6b funding gap, much of it must be funded by borrowings which add to council debt. Current outstanding debt for council is \$8.6b. Through the period to 2028, debt is forecast to grow by \$4.4b to \$13b.

The value of council's total asset base in 2028 is projected to be \$77b.

But from 2019-2024, Auckland Council has limited ability to take on

debt beyond these forecasts and remain within the prudential targets it has set to maintain its AA credit rating.

A key challenge for council is how to continue to support the infrastructure investment levels needed in the city while still maintaining prudent financial settings.

The council has been in discussion on this challenge with government officials for several years, talking about new ways for central and local government to partner to support infrastructure investment in Auckland and other high growth cities where debt levels within those councils are already high.

**Special Purpose Vehicles (SPVs)**

The solutions being explored draw on project financing disciplines, especially around the identification of specific revenue streams (Funding) and connecting these to the providers of capital, including institutional investors, bankers and the wider capital markets (Financing) by using innovative contracting models and structures, such as SPVs, while understanding how legislation can support these initiatives (Facilitating).

An early example is evident in the Crown Infrastructure Partners (CIP) model, where progress is being made within greenfield housing sites.

The key elements that enable accelerated investment through this model include:

**A.** Opportunity for CIP and developers to contract in a way so up-front cost of bulk infrastructure investment is recovered from new home buyers through an annual charge over a long time, 25 years plus.

**B.** The level of this annual charge

being affordable to the market so developers, who are entering into larger-scale commitments through the CIP model, have a commercial proposition.

Other larger infrastructure projects outside greenfield housing sites are also being considered. A key challenge to consider in these scenarios is how to secure the project revenue stream. Council and its CCOs are currently able to use their statutory charging powers to recover the costs of building and maintaining public infrastructure. With some of the larger, more complex projects it is evident legislative changes may be necessary to help resolve the revenue stream challenge.

Walker says the specifics of SPV structures as a response to the infrastructure funding gap are still being worked on.

"We know with most projects that the growth profile of the underlying project revenue source as well as construction risk represent two of the key risks successful SPV structures need to resolve.

"The objective is to identify how other significant participants can credibly own these risks; it's about drawing on well-understood project finance disciplines and applying these in a NZ setting.

"We know that long term investors in superannuation, pension and insurance markets are keen to invest directly into infrastructure projects and understand the underlying revenue profile.

"Depending on the nature of the project, we think there may also be an important role for central government in helping to support key elements of project risk."

## GOING GLOBAL NOW A LITTLE EASIER

As New Zealanders, we've often looked overseas to give our big ideas the scale they deserve. As ANZ is present in 33 markets offshore, we can help customers looking to expand or launch overseas. Our local knowledge, combined with our global connections make it easier for you to stay on top of your growing business.

ANZ Institutional



# Get this show on the road

**A**uckland's traffic congestion and transport infrastructure deficit are legendary. There is an unprecedented demand for new infrastructure.

A key weakness has been getting council and government focused on delivery of outcomes with speed and urgency.

There are lots of plans but no clear outcome statement or confirmed road map of the single joined-up transport system and story needed to get Auckland in front of its population growth curve. Auckland Business Chamber's Michael Barnett and EMA's Kim Campbell have advocated such ideas to successive governments and councils.

Instead, Auckland Council's preoccupation is a defensive strategy to keep its debt to revenue ratio to just under 270 per cent, arguing that borrowing more will jeopardise its agency rating and therefore increase borrowing costs.

Shovel-ready key projects like Mill Road and Penlink have repeatedly been pushed back.

Auckland Council has refused to leverage capital from its huge asset base, and been slow to adopt alternative "value-capture" revenue and private sector capital tools used widely elsewhere, including North America, Britain and Australia.

In 2016 the Productivity Commission issued a *Better Urban Planning Draft Report* recommending that new value-capture mechanisms should be considered, noting that well-conceived and implemented public projects can increase land values by up to 50 per cent.

Value-capture methods include the sale of development rights and land taxes that allow agencies to capture a portion of the property value uplift from those directly benefiting from major public infrastructure investments.

On the plus side, central government has begun financing major infrastructure projects by public-private partnerships like Wellington's Transmission Gully and Auckland's Puhoi to Warkworth roading projects.

But there's a way to go. Though this procurement method has started to bring the Government and private sector together to deliver key infrastructure, it hasn't yet been applied to address the balance sheet constraints Auckland and other local councils have in trying to deliver major infrastructure.

That seems about to change. In the nearly 12 months the Labour-led coalition has been in office, it has been deliberating on mandating a special purpose vehicle (SPV), Crown Infrastructure Partners (CIP) set up by the previous National-led Government, to fund infrastructure (roads, sewerage and storm water systems) for new housing developments in a procurement method that takes debt and delivery risk away from the council for core growth infrastructure.

While waiting for details on what CIP's mandate will be, an option the Government also has is to move the funding of major infrastructure from its own balance sheet to the private sector.

It is a procurement model that the Spanish construction and transport investment conglomerate, Cintra, is successfully applying world-wide, especially in the United States, to get critical infrastructure funded and built with pace and urgency.

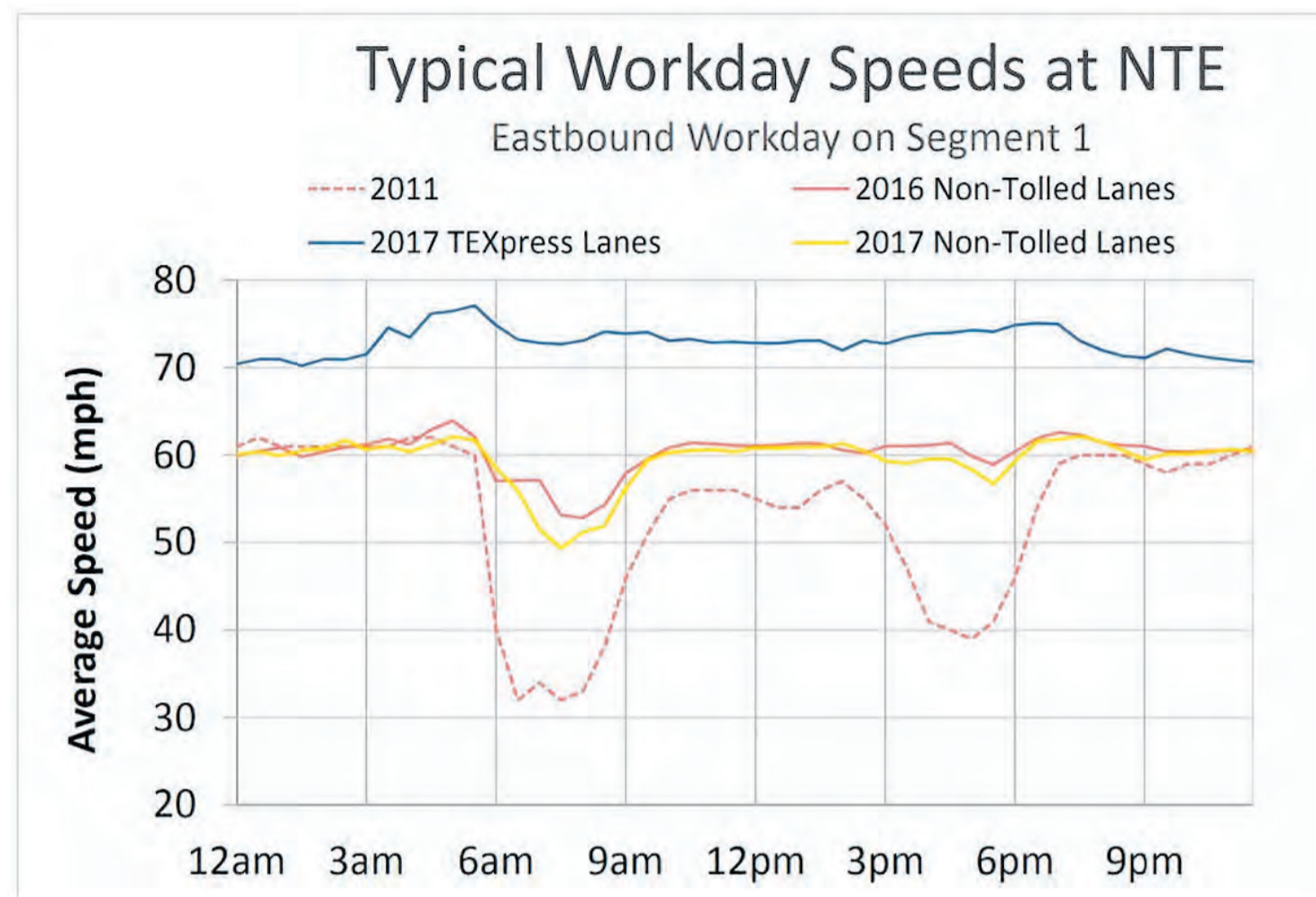
Cintra's US involvement includes a 50-year private-public partnership concession with Texas state to finance, design, construct, operate and maintain a 90-mile toll road from north of Georgetown to Seguin.

The terms of the concession agreement transfer key risks – such as construction cost, over-runs, construction delays, traffic and revenue risks and financial risks – to Cintra.

The terms of the agreement also give the state a share of the toll revenue over the next 50 years, with that share



There are signs the long-time business call for private sector equity to feature in a new transport infrastructure funding model will get government support – but where's the action, asks **Tony Garnier**



(NTE is Texas' North Tarrant Expressway, a 21.4km roadway from Fort Worth to eastern Tarrant County.)

## Tolled Lanes Benefit

There has been a 72% reduction in overall congestion as a result of variable tolling on two managed lane projects Cintra has in Texas:

1. No additional lanes; improved shoulders, road design helped non-tolled lanes flow better
2. Non Tolled Lanes (General

3. General Purpose congestion down from 29% to 9% (time spent traveling at speeds below 50 mph)
4. 72% reduction in overall congestion

increasing as toll revenues reach certain levels, eventually reaching a 50-50 split with Cintra.

A step too far for a Labour-led Government? Perhaps. But encouraged by business organisations, the group of senior ministers driving the agenda – Finance Minister Grant Robertson, Transport and Housing Minister Phil Twyford, Economic Development and Environment Minister David Parker, Regional Development Minister Shane Jones – have all consistently talked about turning on the tap of infrastructure finance, and introducing innovative funding solutions (for NZ Inc) like "infrastructure bonds" and "value uplift capture".

Government has set a target of reducing Net Crown Debt to less than 20 per cent of GDP: surely a strong incentive for it to issue a serious invitation to private sector equity investors to help fund the projects?

Notes Barnett: "There is no shortage of cash and no shortage of private sector interest to invest. Whether it is the NZ Super Fund, iwi and other Kiwi institutions or it is China or Spain or anywhere else, it doesn't matter provided it works and delivers the desired result, and fast."

**Meanwhile, on the congestion "crisis" front**

Government has talked up Auckland's \$1.3 billion transport congestion cost as a "crisis." The message from senior ministers is that to solve the crisis the city needs more focus from central government. Business agrees.

If Auckland becomes gridlocked and is choked by growth, then New Zealand will be stuffed. But where's the commitment and strategy to address congestion as a crisis in need

of urgent action – a here and now agenda?

Since 2014, successive governments have been investigating options to manage congestion on the motorway network. A group of officials are looking at a GPS-based toll network or transport pricing system on the premise of delivering something in the next 10 years.

*If Auckland becomes gridlocked and is choked by growth, then New Zealand will be stuffed. But where's the commitment and strategy to address congestion as a crisis in need of urgent action – a here and now agenda?*

Meanwhile Auckland's new stop-gap regional fuel tax, supposedly designed to generate revenue to help ease congestion, is already garnering criticism as unfair in terms of its impact on the less well-off.

Another criticism is that any benefits or reduced congestion from the tax is years away. Council's debt constraint means it can't or won't spend the money before securing the tax revenue, which will take time to raise and there is no clear evidence that, in the face of Auckland's inexorable growth of motor vehicles on the city's roads, congestion will in fact be eased, or by when.

What business wants is an attack on congestion that gets immediate results and also gives relief to low-



Phil Twyford

income households that depend on a car to travel to work.

An immediate option for Auckland is to expand the gantry-based toll system at the Puhoi tunnels across the motorway network.

Cintra operates motorway network tolling systems in cities across Europe, United States and Australia. In a possible adaption for Auckland, Cintra's system of dynamic tolling used in two Texas PPP concessions would offer a balance between toll-free and tolled lanes which are managed with the toll price increasing during peak periods.

Instead of every motorway lane being tolled, Cintra reports that a mix between free and managed lanes – or low and high-priced lanes – is especially successful in that it gives choice to users. There is always a "free" lane available for the low-paid sector and those not in a rush to catch a plane or get to work.

Notes EMA's Campbell: "Waiting around for credible GPS-based technology is like waiting for a train to nowhere. The gantry system that operates for the Puhoi tunnels is proven – A toll can act as a sort of user-pay regional tax where 'if you don't buy you don't pay'."

He believes Aucklanders are ready for a network congestion tax. It would convey to central government that Auckland is genuinely prepared to pay its way for a more successful city.

**Where does transport infrastructure funding and financing fit into Auckland's wider agenda for Auckland?**

As spelt out in a recent Cabinet paper and under-reported keynote speech by Twyford, the Government wants

a joined-up urban development system linking transport, housing and urban planning – not just for Auckland, but across New Zealand.

Legislation establishing an Urban Development Authority (UDA) is due in Parliament shortly. The Authority is expected to have all the powers of a local government to drive urban development, including:

- Infrastructure funding and financing – to enable a more responsive supply of infrastructure and appropriate allocation of costs; and,
- Transport pricing – to ensure the price of infrastructure promotes efficient use of the network.

The Government wants transport planning and investment to lead urban form, not follow it.

In a bid to get an aligned process in place between Government and Auckland Council, a new Supporting Growth Alliance has this month been formed to take responsibility for planning and confirming around 60 transport projects to support Auckland's urban growth.

The Alliance will support the development of the huge residential and business growth already under way in the priority areas identified in Auckland's Unitary Plan – Warkworth, Silverdale-Dairy Flat, Whenuapai-Hobsonville and Takanini-Drury-Paerata where it is estimated around 30 per cent of the region's growth will occur over the next 30 years.

The idea is that all four growth areas will build on Auckland's proposed rapid transit network for the future, including Light Rail to the northwest.

As a collaborative consortium of government and professional service firms, the Alliance will be responsible for the whole approach, to identifying and protecting routes for the transport network while providing efficiencies in the planning process.

Notes Twyford: "Previously we haven't been able to provide certainty to communities, landowners and other stakeholders about transport infrastructure to support development. Now we can start to answer some of their questions."

It has taken two years of Wellington-Auckland agency talk to get to this point, and the establishment of the UDA is on a 2019-2020 timeline.

To get Auckland's transport system in shape to cope with the city's inexorable growth, Government is playing a long process-centric game using existing organisations. It is an approach with obvious risks.

The tangle of multi-agencies, council and local board groups that operate under what Barnett calls a "business as usual" culture make it difficult to build and maintain momentum to get things done with speed and certainty.

To meet the business call for urgency, the government should take a further step, says Campbell – establish a single, empowered and accountable Auckland-Wellington transport authority tasked to get things done faster, and report milestones achieved to the Government and public monthly.

They have both publicly indicated their frustration that none of the five-or-six "shovel ready" projects that the Government inherited have started.

If the Government is hell-bent on having concrete outcomes to celebrate before the next election, it will probably therefore depend on what progress is achieved by NZTA over the next 18 months on the "game-changer" rapid transit network the Government has tasked it to plan and build. (See story, D16)

● Tony Garnier is an Auckland-based business consultant

# Partnership is close to stalling

**A**t a time when there is a clear need for investment in new infrastructure, and maintenance of existing infrastructure, the partnership between public and private sectors to fund infrastructure is close to stalling. It shouldn't be this way, but investment in infrastructure in this country has always been captive to a lack of long-term thinking.

The current debate over the Central Rail Link is a good example, but this unfortunate Kiwi tradition of not wanting to gold-plate infrastructure goes back to the construction of the Auckland Harbour Bridge and beyond.

New Zealand is also playing infrastructure catch up and the Government has a massive challenge to urgently address historic underinvestment.

While strong population growth has increased the Government's tax take, public and private infrastructure spending has been flat in nominal terms over the past two years.

According to MBIE's recent National Construction Pipeline Report, infrastructure investment projections are dramatically down from 2017 and are set to flat line over the next five years.

The question is how to manage infrastructure investment and planning through a bumpy and changeable political environment.

With New Zealand's short three-year political cycle, projects are halted and reviewed each time a new Government takes office, adding months and even years on to timelines of projects that are eventually approved.



**Infrastructure**  
**Paul Goodwin**

The Waikeria Prison expansion and Waterview Tunnel are good examples.

This is highly inefficient and we must adopt a model so that inter-generational assets can progress notwithstanding our electoral cycle.

Māori have always adopted an inter-generational approach to their decision making – the rest of the country would do well to take a leaf from their book.

Today, we have a National Infrastructure Unit, however its recommendations aren't always adopted.

Planning capabilities in Government departments could also do well to lift to the robust, national long-term planning levels we are now seeing

## How do we go about finding a long term solution for infrastructure?

with local government.

An independent infrastructure body that provides strategic advice to Government and helps build support for bi-partisan projects through strategic long-term planning could be a solution.

As advocated for by Infrastructure New Zealand, it would be arms-length from Government and provide advice for how to best structure and procure projects, off or on balance sheet.

Its procurement specialists could provide advice for how to best deliver projects. It would then be up to the Government of the day to decide how it is funded.

Public-private-partnerships (PPPs), are not the only model, but have been successful in engaging the private sector and should remain an option for their efficiency, risk sharing and

whole of life saving benefits.

An independent infrastructure body has been successful in political systems like ours – Australia, UK and Canada – where they've helped Governments deliver complex infrastructure projects and limited the risk of cost blow outs.

For instance, in Scotland the Government must publicly state why it won't follow the recommendations of Scottish Futures Trust. This would go a long way to prevent objections to infrastructure or procurement methods on pure ideology and tendency for each Government to focus on their "pet projects".

However setting up such an independent body at arms-length from government has a downside. It means the Government of the day could find it difficult to respond urgently to a project that may be a high priority for the public but makes little sense financially or when compared with other initiatives.

Another area the Government is undoubtedly considering is the task of balancing critical infrastructure spend with fiscal responsibility targets – with a publicly quoted target of net Crown debt at 20 per cent of GDP within five years.

The Government does have a sizeable pipeline of infrastructure spending budgeted, but there are several areas, including hospital and schools, where urgent repair is required.

That, as well as general maintenance of infrastructure, is estimated to

cost an additional \$10 billion, which won't necessarily add to the productive potential of the economy but is essential to at least maintain productivity at current levels.

Given all this we could be increasing near-term debt targets to fund critically important infrastructure while the Government books are in good form and interest rates are low. Unlike borrowing for tax cuts or social spending, borrowing for infrastructure is an investment in future economic growth.

The IMF finds infrastructure spending is more effective than other fiscal spending in terms of delivering GDP growth dividends.

We believe that increasing debt, be it from Government or the private sector to fund infrastructure makes sense as long as pragmatism is applied, it is spread across the country (not just Auckland) and projects are phased appropriately relative to capacity constraints.

Building a robust pipeline of infrastructure projects begins with rigorous planning, however ensuring critical projects are prioritised requires advice from an independent body.

We'll be much better served by our infrastructure investments by removing the politics and listening to expert opinion on funding mechanisms, be it public or private capital. The relaxing of Government debt targets will also help spur more investment now.

These are ideas worth considering so we move out of infrastructure catch up mode and into investments which are future-proof and capable of handling a growing country.

● Paul Goodwin is Managing Director Institutional NZ, ANZ

We could be increasing near-term debt targets to fund critically important infrastructure while the Government books are in good form and interest rates are low.

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**Auckland Council**  
Te Kaunihera o Tamaki Makaurau

# Local funding for growth

Are restrictions on local government funding mechanisms stifling the ability of our cities to grow at their best?

**Tim McCready**

**W**hen running for mayoralty in 2016, Phil Goff made the following commitment on rates: "Rate rises will be kept low and affordable at an average of 2.5 per cent per annum or less, if current council fiscal projections are correct and the consumer price index stays low."

The question of how much rates will rise – and the commitment to keep them as low as possible – are cornerstones of any recent Auckland mayoral bid. But there are concerns the current restrictions on local government's funding mechanisms are stifling the ability of our cities to grow at their best.

**Reliance on revenue from rates**  
In New Zealand, council revenue is largely separated from economic performance.

Local government is the core funder of transport and water services for new development, yet its revenue is derived from property rates – which are a cost allocation method linked to council costs, and not to the success of the economy or land prices.

Conversely, central government is the direct benefactor of growth: receiving increased GST, income tax and corporate tax when the economy grows.

Increased council costs mean an increase in rates, irrespective of economic performance, and any efforts made to charge ratepayers more to deliver additional services – including for those without homes who pay no rates – is consistently met with strong opposition from homeowners.

Councils see little funding benefit from growth, and as a result tend to

This is not a new concern: a 2015 review into local government funding by Local Government New Zealand (LGNZ) found that the heavy reliance on property taxes to fund local services and infrastructure fails to incentivise councils to invest for growth.

The only other major source of revenue local government currently has in its toolkit is to lobby central government: Shane Jones' Provincial Growth Fund will see an investment boost in regional New Zealand, and the Housing Infrastructure Fund is aiding high growth councils to advance infrastructure projects that will help increase housing supply.

Yet the patience required for central government to fill the funding gap has seen growth issues turn chronic. Infrastructure New Zealand is concerned that private capital which could have filled the gap has been left searching for opportunities overseas.

## Funding and finance inquiry

Local Government Minister Nanaia Mahuta acknowledges the funding challenges faced by local government and the constraints of rate rises, noting they are rising faster than incomes and cannot be the only solution. She says that – if not met – the funding gap will have consequences for local communities and for the entire country.

"Local government is facing increasing costs for things like three waters, roading, housing, and tourism infrastructure as well as adapting to climate change," she says.

And some of the councils facing the biggest cost increases also have shrinking rating bases."

Last month the Minister of Finance, Grant Robertson, asked the Productivity Commission to conduct an inquiry into how to fund and finance local government.

The inquiry will investigate:

- Cost and price escalation for services and investment, including whether this is a result of policy and/or regulatory settings

- Current frameworks for capital expenditure decision making, including cost-benefit analysis, incentives and oversight of decision making

- The ability of the current funding and financing model to deliver on community expectations and local authority obligations, now and into the future

- Rates affordability now and into the future

- Options for new funding and financing tools to serve demand for investment and service

- Constitutional and regulatory issues that may underpin new project financing entities with broader funding powers, and

- Whether changes are needed to regulatory arrangements overseeing local authority funding and financing.

Stobo says the terms of reference given to the Commission by Robertson are very good, and the requirement to consult with the sector is a helpful recognition of the expertise the sector can bring to the table.

"Prospectively this could lead to some devolution of tax setting and collection powers to local government, and a cessation of inefficient quota handouts from central government."

"The final results need to improve the incentives for councils to responsibly invest in local growth," he says.

The New Zealand Initiative's executive director, Dr Oliver Hartwich, is confident the Productivity Commission will produce good results.

"What is important for the Productivity Commission's inquiry is to consider the incentives under which local government operates, and the Terms of Reference certainly allow

## City overviews and comparison

City	Portland, Oregon	Dallas-Fort Worth, Texas
Metro population	2.5 million	7.4 million
Pop growth 2010-2017	10% (30,000 residents pa)	15% (150,000 residents pa)
Median household income	US\$70,000	US\$65,000
Median home price	US\$389,000	US\$249,000
Home/income ratio	5.5	3.8
Congestion	34 mins	24 mins
Unemployment	4.1%	3.7%

City	San Francisco, California	Denver, Colorado
Metro population	4.7 million	2.9 million
Pop growth 2010-2017	9% (50,000 residents pa)	13.5% (60,000 residents pa)
Median household income	US\$99,000	US\$74,000
Median home price	US\$900,000	US\$418,000
Home/income ratio	9.1	5.7
Congestion	39 mins	24 mins
Unemployment	2.7%	2.8%

City	Houston, Texas	Auckland, New Zealand
Metro population	6.9 million	1.7 million
Pop growth 2010-2017	16.5% (150,000 residents pa)	15% (30,000 residents pa)
Median household income	US\$63,000	US\$67,000
Median home price	US\$234,000	US\$586,000
Home/income ratio	3.7	8.8
Congestion	32 mins	45 mins
Unemployment	4.6%	4.6%

Source: Infrastructure NZ report — Enabling City Growth: Lessons from the USA



The city of Houston uses sales taxes to fund general activities.

## Taking lessons from America

Earlier this year, Infrastructure New Zealand led a delegation of NZ representatives to Portland, Denver, Dallas-Fort Worth, and Houston – four US cities that are growing more affordably than Auckland – to consider how they are doing what they are doing, and what New Zealand can learn from them.

The report, *Enabling City Growth: Lessons from the USA*, provides detail on the lessons learnt from the visit, including the following on how local authorities are funded:

- US cities have a number of funding mechanisms that are tied to

their economic performance.

Denver, Dallas, and Houston use sales taxes to fund general activities, and each has levied a 1 per cent sales tax to deliver improved public transport.

- Dallas and Houston have property taxes with a strong link to property value. In each case, the revenue of the city and its component institutions increases with the success of the city in growing the economy and delivering homes.

- Portland, the city with the greatest growth challenges, also has

the fewest incentives to grow. There is no sales tax in Oregon, removing this option also for Portland.

- Instead, Oregon relies on comparatively high income and corporate taxes, but has not extended the ability for Portland to levy these direct.

- Property taxes in Portland have been tied to inflation since the early 1990s. Thus, property values have now become detached from property rates and the two are only reviewed when properties are significantly changed or redeveloped.



After more than a century of centralism, New Zealand needs to go local. Councils and communities must be able to make their own decisions about their future.

Oliver Hartwich,  
The New Zealand Initiative

have a culture of cost minimisation, heavily influencing their decision making at the expense of value creation.

"Importantly, from a local government economic development perspective, property taxes are not the best incentive to encourage councils to invest in infrastructure," says Local Government Funding Agency chair Craig Stobo.

"If council revenue streams were tied to their performance, successful councils would accrue more revenue, providing more choices for their communities."

that," he says. "More specifically, it will allow the commission to consider the OECD's recommendation to the New Zealand government that councils should participate in tax revenue increases resulting from economic growth."

The commission's final report is expected to be presented by November 2019.

## Calling for localism

Coinciding with the announcement of an inquiry, LGNZ and The New Zealand Initiative launched their Localism project, calling for a shift in the way public decisions are made in

New Zealand by seeking a commitment to localism. LGNZ President and Dunedin Mayor David Cull says it is important the new funding options incentivise growth.

"[The Localism Project] will highlight how the right incentives and funding can build strong local economies and vibrant communities. The urgent need to properly empower councils is reinforced by the fact that decentralised countries tend to have higher levels of prosperity than centralised ones.

"New Zealand is among the most centralised countries in the world.

"We should not expect central gov-

ernment in Wellington to be the best decision-maker for every local problem. Communities often know best what they need."

The New Zealand Initiative's Hartwich adds: "After more than a century of centralism, New Zealand needs to go local.

"Councils and communities must be able to make their own decisions about their future."

A final report and publication of the Localism Proposal is expected in early 2020, and Hartwich notes there will be ample opportunity for the Localism report and the Productivity Commission inquiry to cross-fertilise.

# Much earlier dialogue needed

**T**he Government has a multi-year, multibillion-dollar infrastructure programme planned, but it is increasingly unclear who will build the projects the country needs.

The construction industry faces challenges. It is not just bit-players that have found the going difficult, Mainzeal's collapse five years ago heralded an era in which even the country's largest construction firms have found business difficult.

"Projects come with all types of risk," says Paul Buetow, Partner in Kensington Swan's Construction and Major Projects team. "Political risk as to whether a project will go ahead. Timing risk as to when it will be undertaken. There is also consenting risk, management of stakeholders and procurement risk – will the model that is going to be adopted be one that a contractor is prepared to entertain? And, of course, there is contract risk. Risk should lie with the party best able to manage it, but this is often not the case."

Experts suggest an ongoing open early dialogue between parties goes a long way towards providing comfort around the risks major projects present.

## Political risk

There is a general consensus that New Zealand's infrastructure is crying out for investment. But how to meet the need – and fund new developments – is subject to fierce debate.

The *Government Policy Statement on Land Transport* published in June marked a departure from the trend under the previous National government. Less focus on roads, greater emphasis on rail, walking and cycling, and public transport.

The expansion of Waikeria Prison is another case in point. National had

Communication, engagement, and transparency are key to addressing the risks in New Zealand's infrastructure programme, as experts from legal firm Kensington Swan explain



**Paul Buetow**



**Nicky McIndoe**



**Mihiarangi Piripi**



**Matthew Ockleston**

proposed a 1500-cell prison, to be constructed under a public-private partnership model in a project valued at around \$1b. But in June it was announced the facility would be a 500-bed expansion with a mental health facility of a further 100 beds.

"One of the things that I've noticed over the past 10 years is that the timing and funding of projects has become more politically driven," says Nicky McIndoe, Partner in Kensington Swan's Environment and Planning team. "There has been a trend for projects to be bigger, so the stakes are higher."

This sort of uncertainty is a fact of life in a democracy, particularly one like New Zealand with a three-year electoral cycle. The UK's runs over five years, and the US and Australia go to the polls every four years.

But these risks can be mitigated and addressed. Collaboration and communication removes some uncertainty from the environment and allows for the necessary planning and resourcing on the part of contractors. "There needs to be more biparti-

san, cross party decision-making and greater collaboration and communication between central and local government. Government and Auckland Council working more closely to address Auckland's transport needs is an example of the type of collaboration required."

"The major political parties may have some differences, but we need to agree for New Zealand's benefit on the key projects that everyone accepts must be undertaken. We need a pipeline of projects coming through and some certainty around timing. This provides the market with certainty and allows contractors to resource to meet upcoming needs," Buetow says.

## Engagement

The consenting process can be a stumbling block, particularly for projects that attract public interest and opposition. The Resource Management Act does not require applicants to consult anyone before seeking consent. However, it is best practice and McIndoe says engaging

stakeholders early can yield rewards.

"If you engage with the community, not only will it ease your consenting path, but if there is a groundswell of support for a project a political party would be more nervous to reverse a decision to proceed. Engaging addresses both the political risk and the consenting risk, so it is a good solution."

Early stakeholder engagement is particularly significant to projects that will impact upon tangata whenua. "Unsurprisingly, iwi and hapu appreciate meaningful, up front and early engagement," says Mihiarangi Piripi, Senior Associate in Kensington Swan's Corporate and Commercial team, "and it's much better for the relationship going forward."

While engaging with Māori stakeholders may include the same considerations as consulting with other parties impacted by a proposed project Piripi, who works in Kensington Swan's Pakihi (Māori Business) practice, says there are additional and unique factors when Māori stakeholders are involved.

"There can be added complexity when the area is unsettled from a Treaty perspective, and there are groups that might assert rights and interests in the area. It becomes quite difficult – who do you talk to?"

"You need to be open and transparent in your dealings and where possible deal with representative entities as opposed to individuals."

Many major projects, particularly significant state highway projects, re-

quire land to be compulsorily acquired to free up the corridor for development.

Balancing the need to spend public money prudently, and appropriately compensate landowners, can be complicated. But, again, an open dialogue begun early in the process is key.

Kensington Swan Partner Matthew Ockleston is a specialist in the Public Works Act, the legislation that provides for government entities to acquire land for the development of public infrastructure or services.

He says acquiring someone's land or relocating their business is "a very personal thing".

"Building a relationship with them and keeping them informed, feeling like they retain a degree of control is often the key to closing those deals. Closing the deals is the key to delivering the land on time, which is the key to enabling the project."

## Contracts

Properly allocating risk in construction contracts is a major current challenge. Buetow says one way of managing risk is to price it, but this is difficult when projects are often being assessed on lowest price, and even when they are assessed on best value, price remains a critical component. Downward pressure on pricing combined with increasing input costs makes it difficult for contractors to place an appropriate risk premium in their bids.

continued on D8

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# Deliver on concrete foundation

What we have has been built up over years of careful planning, diligent budgeting and financial management, and we do not want it squandered, writes National MP **Judith Collins**.

**U**nfortunately there're some very worrying clouds gathering on the economic horizon.

I'm concerned at the impact that this could have on our country.

Recently, there have been an array of negative economic indicators including an ANZ business confidence survey which showed that levels were at their lowest ebb since 2008 – the midst of the Global Financial Crisis.

The latest National Construction Pipeline from MBIE shows infrastructure investment projections down dramatically on 2017, highlighting the problem of uncertainty in the infrastructure sector and raising serious questions about New Zealand's ability to service new housing. BRANZ research shows overall infrastructure capital expenditure is forecast to flatline over the next five years.

If we consider construction and infrastructure, investment is stalling and going backwards in some areas. There's a lack of leadership from this Government, generating uncertainty and stagnating the economy.

There are major projects in the pipeline, waiting for signoff. These include "Mill Rd", "Penlink" and the "East West Link" in Auckland as well as components of "Let's Get Wellington Moving" and major upgrades to the SH2 corridor north of Tauranga among other state highway projects nationwide.

These projects are needed for homes, tourism and regional



When the economy is growing, wages and jobs increase. We can build infrastructure like schools and hospitals, and invest more in better public services.

economic development.

But it's wider than that – and problems extend into the residential and commercial construction as well. That's what I'm hearing on the ground and the sector is concerned that there is now a relocation of resource to Australia.

So the question must be asked – has Government's agenda come at the expense of economic growth in

this country and if so, is it time for the Government to acknowledge the damage that it's doing and focus on turning things around?

National's plan was step by step, development by development, getting on and addressing New Zealand's housing challenges.

Under National, New Zealand was on track to build nearly 200,000 houses over the next six years and more houses were being built faster.

All of that progress is being thrown out in favour of ill-thought through plans such as the KiwiBuild policy.

Labour's KiwiBuild policy was first announced in 2012. Now six years later and after ten months in Government, the Government cannot answer basic questions.

They cannot answer how the industry would be funded, how the industry and buyers would get

around bank lending restrictions, how they would free up land to build houses on and how they would get around the Government's immigration confusion to find the construction workforce needed.

The previous National government made three changes to the Resource Management Act, in 2009, 2013 and 2017.

We made some good changes when we were in Government but concessions due to coalition agreements made some changes difficult.

While in opposition, I have been listening to people across the country and we all agree an overhaul is needed. That's why I have publicly stated that our proposed changes to the Resource Management Act will be available for discussion before the next election.

When the economy is growing, wages and jobs increase. We can build infrastructure like schools and hospitals, and invest more in better public services. But when the economy is stalled, we cannot manage without borrowing more or raising taxes. No one wants to see that happening.

This year is about listening to our communities, next year about getting feedback on the ideas we put forward and 2020 about delivering the concrete plans that show New Zealanders we are ready to lead.

● *Judith Collins is National's Spokesperson for Housing & Urban Development and Spokesperson for Planning (RMA Reform).*

## Being open is key

continued from D7

"Profit shouldn't be a dirty word," Buetow says. "It's the contractor's insurance premium for the risk they take on board."

Indeed, assessing risk is becoming more difficult as new infrastructure plans, like the CRL, and light rail proposals for Auckland and Wellington, represent new ground in the New Zealand context.

McIndoe says infrastructure developers are asking their contractors to demonstrate innovation in their approach, giving rise to further uncertainty.

"As soon as you are doing something unusual there is a risk," she says. "There is the potential for great benefits, but it is not always clear who's wearing the risk of that innovation."

Kensington Swan acts for infrastructure providers, major contractors and consultants, and industry associations. Buetow says he is aware of occasions recently where major contractors have elected not to bid for work having decided the risks did not justify the rewards.

Being open about the demands of projects, and fair about the compensation for shouldering risk, is necessary to calm contractors' nerves and ensure the health of the sector.

"Let's be really clear from the outset as to where risks lie, who bears them and how they are to be managed," Buetow says.

"That way everybody goes in with their eyes wide open, knows exactly what risks they are taking on board, and knows how they intend to address them."



**Infrastructure**  
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# Sector needs confidence

Lack of certainty over the project pipeline is a key concern for NZ's infrastructure industry, reports **Bill Bennett**

**A**ecom NZ managing director Craig Davidson says while certainty has always been an issue for the industry, it has moved centre stage in recent weeks.

"A new Government has come in with very different priorities," Davidson says. "That's turned the infrastructure industry on its head, particularly the roading side."

"We're seeing the impact of that in the projects we've tendered for and also with our partners and contractors."

Aecom NZ runs an annual survey monitoring sentiment in the infrastructure and buildings construction industry. Davidson says the latest survey identifies the risks of uncertainty around the projects pipeline. People don't know for sure what is going to be done and when.

The Labour-led Government has switched the national priority away from road building towards public transport projects.

Davidson says the Government talks of \$28b of investment in Auckland transport infrastructure alone.

Though that sounds good, "when you drill down into where that money is being spent, there are next to no shovel-ready projects for the industry to pick up on."

"Take the \$6b-plus commitment to light rail. At this stage there's no flesh on what that actually means for contractors and consultants."

"Light rail has replaced road projects like Mill Road, the East-West link and the Tauranga Northern Link. These were a long way through the consenting and design process."

The industry has been geared up for a certain type of project ever since the National Government put a huge amount of investment into the Roads of National Significance programme which started in 2008. These are all now coming to an end.

Davidson says the industry was expecting those kinds of projects to continue, but we've "turned the dial to address public transport".

He says it not a question of whether one approach or the other is good or bad.

"It's more that Labour's infrastructure priorities are very different to National's," he explains. "Now we have Simon Bridges saying that a future National government would not do the light rail project in the same shape or form as Labour."

The projects in question are big and complex. To do them well requires international expertise.

Davidson says we haven't built a light rail project in New Zealand before. "This means we have a choice of trying to do it ourselves or we can try and leverage the best of global expertise for design and construction."

"It's the kind of project Aecom has worked on overseas so it could pull in experts for the job."

There's another issue here. Procurement costs in this country are high by international standards.

Davidson says one reason for higher costs in New Zealand are delays and deferrals of projects. This applies to the last three road projects put in place by National.

He says: "The Mill Road project went out to tender. It had design consultancies tender for the work. They submitted tenders and the evaluation started. Then the new government canned the project. As much as \$2 million had been invested in tendering. That's an opportunity cost for NZ Inc."

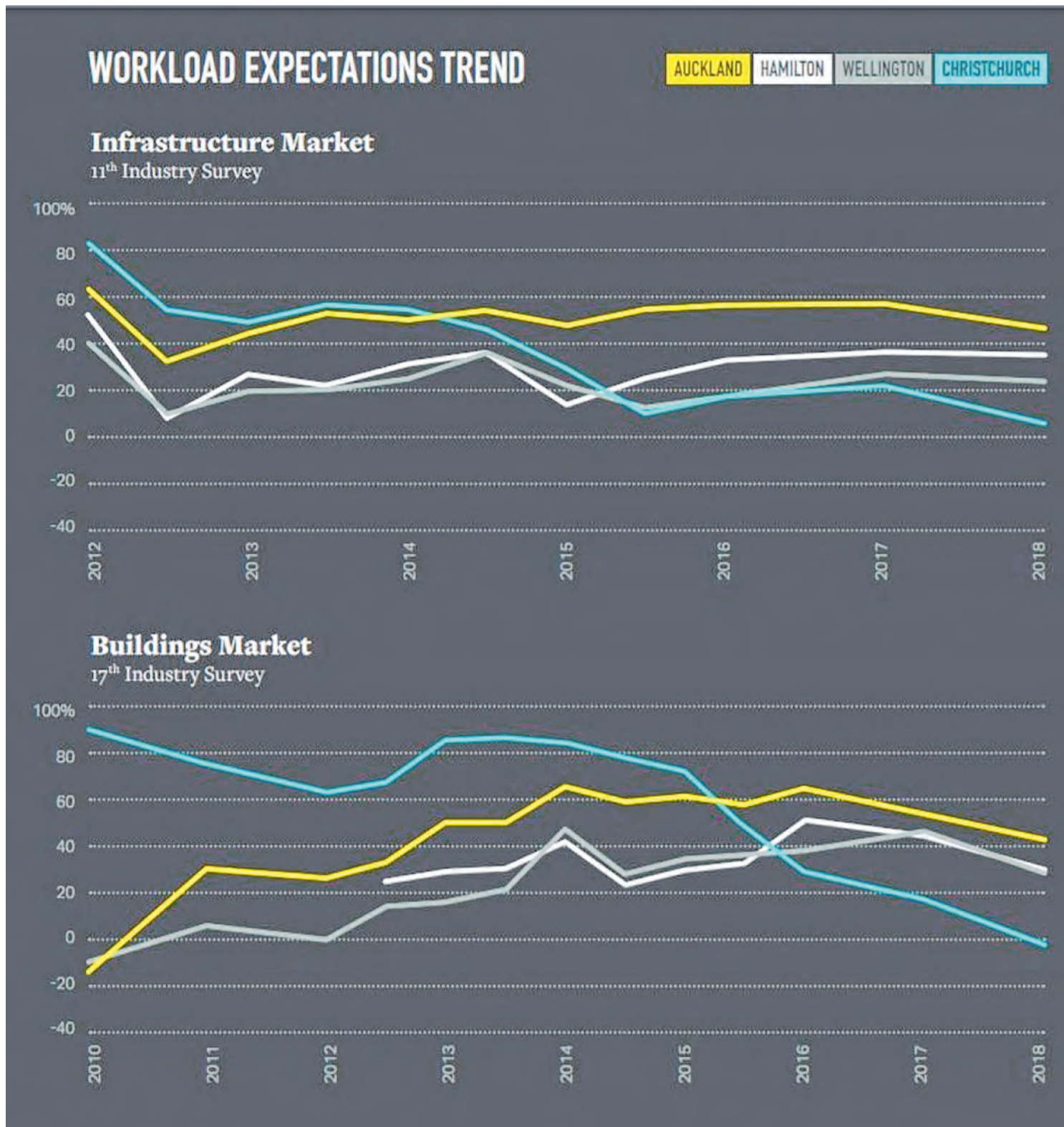
The cost to win a dollar of work is also substantially higher here than overseas. In particular, the US, the Middle East and Asia are cheaper.

In part this is because our project sizes are smaller.

There is also a tendency to break



Craig Davidson says New Zealand needs an independent infrastructure organisation



NOTE: Industry sentiment in the Buildings Market has been surveyed since 2010, while the Infrastructure Market and the Hamilton region have been tracked since 2012. This chart shows the trend in net workload expectations.

up projects into components.

Davidson warns that if you overlay procurement issues with a reasonable chance of a National government being returned at the next election and halting projects, you don't have the best conditions for the international infrastructure market to want to operate in New Zealand.

A worldwide boom in infrastructure projects amplifies this.

For instance, there are major rail projects either being planned or

under way in all the main cities along Australia's East Coast. "If you were a contractor looking at where to invest your best and brightest people, your money, do you have that kind of certainty in New Zealand?"

Aecom's 2018 sentiment survey highlighted another disconnect between the organisations, usually government, funding infrastructure projects and the firms doing the work.

Governments tend to think certainty is about identifying a need for

a project, giving it the green light and then setting aside the money.

Industry requires more information for its version of certainty. They need to know more about the project details, when it is due to be delivered and how is it going to be procured.

Davidson says without that, the industry is not able to invest in recruiting people, training or investing in the plant and equipment.

Large organisations need certainty to invest and grow. Without certainty,

## 2018 Aecom Report

- **Infrastructure Market**
  - Sentiment remains optimistic; however there has been a softening since 2017. Key drivers of the sentiment decline are the market's desire for improved confidence in the pipeline of project and transparency around funding.
  - Workload expectations in the country's infrastructure market are up slightly with more than 70 per cent of respondents expecting investment levels to remain steady or rise over the next three years.
  - Expectations in Auckland have softened for the first time in four years, while Hamilton and Wellington have experienced a subtle decline in those with a positive outlook.
  - Christchurch is continuing its downwards pattern – likely reflective of the major infrastructure projects due for completion in the next two years and an unclear outlook into further prospective projects.

- **Buildings Market:**
  - Sentiment in the vertical market is experiencing a significant softening, with all regions reporting less confidence in the forward workload.
  - Of note, Christchurch dropped by nearly 20 percentage points from the 2017 survey with respondents now expecting an overall decrease in workload over the next year.
  - There is a clear need to take a step back and redefine what success is going to look like for the city, with respondents expressing a need for increasingly strong leadership to drive progress and a cohesive vision to move forward.

they rely instead on large numbers of small subcontractors they can cut at any stage.

This is often not the most efficient approach.

Davidson says one problem is that infrastructure gets votes for politicians but the timeframes for projects typically outlast election cycles. Many would outlast even a three-term New Zealand government he says, singling out Auckland's City Rail project as an example of how long things can take.

New Zealand's three-year election cycle also comes with its own set of problems.

Davidson says there is a danger projects can be fast-tracked so they are started and reach the point of no return. That way the next party to enter government has no choice but to carry on with them.

"Rather than building political consensus, they spend a whole lot of money so it's not possible to go back."

Infrastructure New Zealand offers a way out of having projects tied too closely to politics – It has proposed an independent infrastructure body or "i-body".

Davidson says most countries have some kind of independent infrastructure organisation. The idea is that it looks at the country's infrastructure needs then draws up a list of priority recommendations where a government can get the best return on its investment dollars.

He says it needs to be made up of high calibre industry experts and they need to be able to look across the various government departments.

Governments still get a final say on projects, but the pipeline is far more certain and that means the industry can better marshal resources.

# Best bang for our buck

**T**ransport Minister Phil Twyford says in the next 10 years, New Zealand is going to be spending \$45 billion – the biggest investment ever in transport. He says the Government has changed the priority so there will be fewer urban expressway projects – which were the go-to option for the last government – which “we always felt was to the detriment of the broader transport system”.

The Labour-led Government is trying to take a more ‘mode-neutral’ approach. Twyford points to the Golden Triangle (between Auckland, Hamilton and Tauranga) as a really good example where you could have rail alongside motorways and roads, offering better options and taking pressure off the road system. “It’s the same logic behind the rapid transport system in Auckland.”

To Twyford, the problem with motorways as the primary transport network is peak-hour congestion. “When you’ve got rapid transport alongside it helps to take off the pressure. The same logic applies for freight transport – some freight can be moved more efficiently by rail or by coastal shipping.

“We spend \$5b a year on transport, so let’s choose what we invest in for a particular corridor or freight path that’s going to deliver the best bang for our buck for the country.”

## What do you say to calls for certainty around these projects?

**Twyford:** Our Government sees infrastructure as a critical part of nation-building. The new Government’s mix of projects and policies will be different and have a different complexion, reflecting our overall policy direction – but we are still going to be building infrastructure.

We’re working very hard, and are very conscious that the system has to recalibrate. There are still going to be projects – more than there were before. I want to provide assurance that we’re going hell for leather and making sure there is a pipeline of projects.

## What do you expect to see from the private sector around the light rail development?

**Twyford:** Light rail will be a massive stimulus to private investment – that is why it’s such an attractive option. You see that now all over the world;

investment into light rail because of the permanence of tracks and the quality of the urban neighbourhoods it produces. It is quiet and safe and coexists with pedestrians and cars, meaning that you get neighbourhoods that are a magnet for investment. There are billions of dollars of private investment going in alongside light rail, as can be seen in the Gold Coast, Canberra and Sydney. By taking a more joined-up approach, we can stimulate lots of other growth and development led by the private sector. The urban development authority we are going to create will plan the development and zoning around those lines, optimising and de-risking the opportunities for private sector investment.

## Hasn’t this area been the domain of local government?

**Twyford:** Historically it has. But we are consciously inserting central government into this space – not taking away local government’s role,



but putting ourselves in there as a partner.

We haven’t done this kind of second generation urban growth well in New Zealand. We need the heft of central government and central government’s ability to rise above local nimbysism and vested interests, which is in the interest of the whole country. When you stop the city from growing, bad things happen. Land prices go through the roof and that’s a big part of the housing crisis that we’ve inherited. We want to build affordable houses or else our kids will never be able to afford to live in this town.

## What makes you passionate about developing affordable housing?

**Twyford:** As a Labour politician, this issue is fundamentally about social justice, and the ridiculous state of our housing market is an affront to the egalitarianism or decency that we have in this country. As important as making things better for the most vulnerable is, we will never solve this

problem without tackling the structural state of the market. That is why we have to consider the planning system, infrastructure financing, the low productivity in the construction industry, the tax system – they are the really big drivers of the problem we’ve got.

## What are you considering in terms of pre-fabricated housing?

**Twyford:** We’re about to do an invitation to pitch to offsite manufacturing companies here and abroad on how we can build a large-scale off-site manufacturing industry for residential. When you are building several thousand state houses a year – plus all the KiwiBuild homes – for the first time ever in New Zealand, you’ve got the potential to contract thousands of homes a year, over multiple years. That is – at last – the kind of conditions where you could allow some firms to scale up. There has been a lot of appetite on that from industry.

## What do you make of the current state of the vertical sector?

**Twyford:** Master Builders has convened an industry group in the vertical sector that I think is really helpful. There is a recognition that while there are some things government can do, there are things that industry needs to do as well. We don’t want to see companies falling over, we need a viable New Zealand industry.

There are things we could learn from the horizontal sector, which is in good shape. They are bringing in big projects on time, and at a good quality. There is a partnering approach and a more transparent negotiated approach to risk allocation. We could learn a few things from that in the vertical sector.

# Sharing the risk

continued from D1

“It can’t just be all about price, you’ve got to recognise there’s got to be something in it for the other guy.”

“Whereas the past few years it’s just been all about screwing down price, which puts risk on to the other guys so that your side of the fence is fine and the other guy doesn’t look that flash but that’s not your problem.

“That’s very shortsighted. I think there’s emergence of a recognition that that is not sustainable.

“Certainly within the construction side of the business there is a greater discipline now too around price and risk allocation and not taking on so much work they can’t resource up these projects properly.

“All the construction firms, by and large, are very reliant on local supply chains. They haven’t built up international supply chains which allow them to scale up quite quickly. And that’s been part of the problem.”

ANZ reports the construction industry is dealing with significant challenges. Firms are experiencing financial strains and there are reports of unsustainably thin margins.

At the same time, the industry is struggling to keep up with demand in the face of capacity pressures. Labour shortages are a much-cited problem, but problems run deeper; as well as issues with contracts and boom-bust dynamics, the productivity performance of the industry is poor and needs to be addressed.

It warns that in light of these challenges, it will be difficult to achieve further increases in construction activity from here, despite strong demand.

– Fran O’Sullivan

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# Alliances way of the future

**F**letcher Construction is determined to remain at the forefront of major infrastructure developments in New Zealand by perfecting the art of collaborative contracting.

Fletcher's new general manager infrastructure Tommy Parker is in the enviable position of seeing both sides of the story after "jumping the fence" from the New Zealand Transport Agency (NZTA).

He has moved from being the client to the contractor and is quickly understanding the issues and pressures of both parties. There have been misunderstandings in the past – on both sides – and improved collaboration is critical to delivering the best infrastructure outcomes for New Zealanders," he says.

"By working together and finding solutions, we can offer a sustainable and prosperous industry," Parker says. "The Government's commitment to infrastructure and nation building also gives me a lot of confidence in growing the industry.

"New Zealand can be world famous for its collaborative contracting, and I want Fletcher to be the leading contractor in large, complex infrastructure projects.

"We are keen to see how the long-term pipeline of work settles down and when the contracts come to the market – and we will prepare and make sure we have strong teams with the right skills in place."

Parker says good infrastructure, particularly transport, is the backbone of a strong society. Across the world, countries are striving to fill the infrastructure deficit, and are using new and innovative ways of funding, planning, building, maintaining and operating transport systems.

"My goal is to be an influential leader in meeting this challenge," he says.

British-born Parker, who has a Masters in Transportation Planning and Engineering, spent 14 years with NZTA and its predecessor Transit New Zealand before taking up his role at Fletcher in April this year.

He was General Manager System Design and Delivery, Group Manager Highways Networks and Operations, and State Highway Manager for Auckland and Northland at NZTA.

After the Kaikoura earthquake, Parker became chairman of the North Canterbury Transport Infrastructure Recovery alliance to rebuild the severed road and rail connections. Fletcher is a partner in that rebuilding.

While he was at NZTA, Parker led the Waterview alliance project through evaluation, consenting and delivery for New Zealand's largest transport project – the 2.4km road tunnel that connected Auckland's Western Ring route.

He believes infrastructure alliances are the way of the future. "We can mix latest technology and best practices from overseas with the local knowledge and expertise.

"I'm impressed and inspired with the level of professionalism and enthusiasm shown by our teams on the ground completing projects such as the Hamilton bypass and Kaikoura rebuild. In the middle of winter, they are starting in the fog at 6am on terrain where the geotechnical and engineering work is not easy.

"The New Zealand taxpayer does get good value for money from the industry as a whole," says Parker. "The challenge now is to adapt to the changing political agenda and new technology that provides a lot of opportunities.

"We want to be a strong partner and get the right balance of international best practice and local expertise."

Parker cites the Waterview Connection as an exemplar for alliance projects. "Fletcher had the local knowledge and the Japanese (Obayashi Corp) provided the tunnelling smarts. For the country's contracting industry, Waterview sig-

New infrastructure GM at Fletcher Construction sees a bright future for the industry as the government creates a pipeline of nation-building projects



Alliance project manager Matt Fairweather (left) updates Tommy Parker on progress of the Waikato Expressway Hamilton Section project.

## The projects

Fletcher Construction's current major projects are:

- Puhoi to Warkworth Motorway. Extending four-lane Northern motorway (SH1) 18.5km from Johnstone's Hill tunnels to just north of Warkworth – including a large flyover. Five years to build, to be completed in late 2021. Worth \$709.5m, it is New Zealand's second Public Private Partnership contract for a state highway. The Northern Express Group comprising ACC, Morrison & Co PIP, Fletcher and Acciona Concesiones S.L. will construct, manage and maintain the motorway for 25 years.
- Hamilton Section, Waikato Expressway. Largest roading project in the Waikato, 21.8km section of the expressway running from Ngaruawahia in the north, east of Hamilton to the Tamahere interchange in the south. Includes 17 bridges, five new interchanges, walking and cycling paths, and requires 28,450 cubic metres of concrete, 212km of road markings, 126km of fencing and 1.3m tonnes of aggregate. Finished in 2020 at a cost of \$637m by an alliance comprising Fletcher, Beca, Higgins, Coffey, Hicks Bros and NZTA. Completes the 102km expressway from Auckland's Southern Motorway to south of Cambridge and will cut 35 minutes of travel time from Auckland to Tirau.
- Peka Peka to Otaki Expressway. Constructing 13km four-lane expressway from Mackays Crossing and bypassing Otaki. Forms part of the Wellington Northern Corridor

running between Levin and Wellington Airport. To be completed in 2020 at a cost of \$330m.

- MHX Kirkbride. Upgrading SH20a route to and from Auckland Airport, including new motorway interchange at Kirkbride Rd intersection and Landing Drive roundabout with an eight-lane intersection and traffic lights. Completed this month at a cost of \$160m by an alliance comprising NZTA, Fletcher, Beca and Higgins.

- North Canterbury Transport Infrastructure Recovery (NCTIR). An alliance that includes Fletcher-owned Higgins and Brian Perry Civil (120 people) is restoring and upgrading the main road and rail networks following the November 2016 Kaikoura earthquake.



Fletcher Construction CEO Michele Kernahan at the Puhoi to Warkworth site.

nalled a change in gear in terms of project delivery.

"We hadn't built a big tunnel like that before. We geared up and the industry responded. It demonstrated what New Zealanders can achieve – delivering a complex and challenging infrastructure that met the highest world-class standards."

Fletcher has partnered with Spanish company Acciona Infrastructure to build the Puhoi to Warkworth motorway, due to be completed in late 2021.

"We are learning a lot from Acciona, mainly around systems thinking. It's proving to be a good joint venture – the culture is great. We do have a shortage of engineers in this country but a few good thinkers from Madrid adds to the mix," says Parker.

He believes Fletcher has the resources to overcome any skilled labour shortages.

"That's why we need to see a long-term pipeline of projects and a strong procurement process. That can make a big difference to the success of a project. We can all work together – consultants, clients and contractors – and put the right teams and skills in place.

"We will continue to compete for the best skills globally, but we also need to focus on local training and upskilling especially for field operatives and engineers.

"As we see the work come to the market, we can ramp up with a combination of overseas recruitment and locally trained staff, he says.

"The Kirkbride work is coming to an end and we will have workers to relocate on to other projects."

The Manukau Harbour Kirkbride project (MHX Kirkbride), an alliance between NZTA, Fletcher, Beca Infrastructure and Higgins, is due to be completed this month. It is the main road to Auckland Airport and includes a new Kirkbride Rd interchange and intersection at Landing Drive.

Fletcher is also turning its attention to water infrastructure. Parker says

Fletcher will next month bid to construct the \$1 billion Central Interceptor with the same team that built the Waterview Tunnel. It is a construction model with Watercare having completed the design.

The Central Interceptor wastewater tunnel will run 13km from Western Springs to the Mangere treatment plant, at times going 110m underground and about 15m below the seabed across the Manukau Harbour.

The New Zealand taxpayer does get good value for money from the industry as a whole. The challenge now is to adapt to the changing political agenda and new technology that provides a lot of opportunities.

Tommy Parker

Fletcher recently attended a briefing for the latest rapid transit plan in Auckland, and Parker says: "We will be following this project with interest."

The Auckland Transport Alignment Project (ATAP), led by NZTA, will provide light rail between the city centre and the airport, and to the northwest suburbs within the next 10 years.

"I'm really enjoying the new role," says Parker. "It's been a big learning curve and having been the client and now the contractor I can see there is a need for strong collaboration."



Transpower's Alison Andrew is one of a few trailblazing female CEOs in the infrastructure industry.

# WINNING WAYS

Women are finally making inroads into the industry and challenging infrastructure's 'boys' club' reputation



Infrastructure  
Gabrielle Penn

**E**nsuring more women are involved in infrastructure will benefit all New Zealanders, says the head of a recently launched organisation focused on getting more women into the traditionally male-dominated industry.

Margaret Devlin, who is chair of the Women's Infrastructure Network (WIN), maintains "with more women in the industry, we see diversity living up to all the statistics that prove it does add value".

However, for diversity to become truly present in the workforce, men must be on board too.

"The reality is that you can't just say we'll have our own infrastructure network group, and that's going to make all of the change," says Devlin. "You actually have to engage with everyone, and everyone has to see the value proposition."

WIN was launched in 2016, with the goal of increasing the number of women in leadership roles, growing the visibility of women in the industry and providing networking tools and opportunities.

The group now has five national chapters in Northland, Auckland, Waikato, Wellington and Christchurch, with another planned for Otago. With nearly 1000 members in New Zealand, the group is also well-connected to a larger global WIN network in the United States, Britain, Canada and Australia.

Though the infrastructure sector is perceived by many as an old boys' network, a survey undertaken by WIN found the industry is aware of its shortcomings: those surveyed see lacking female representation as a



problem, and many organisations are taking steps to address it.

The industry has had some improvement in recent years, and several notable female CEOs have been promoted, including Transpower's Alison Andrew and Chorus's Kate McKenzie. Yet despite these high-profile hires at the top, in the past decade the rate of female participation in the industry has still only increased from 10 per cent to 17 per cent. In fact, engineering remains one of the most male-dominated fields in the country, surpassed only by labour-intensive industries such as forestry and building trades.

Devlin says progress is slow as firms often do not know how to approach the problem.

WIN was set up in New Zealand to help give organisations assistance in this regard.

"If I look at the Women in Infrastructure network, one of our

objectives is to normalise diversity in the sector," Devlin says, "It's about how do we actually make that happen and how do we share those practises that we're currently using – such as employment practices, revising the traditional nine to five roles – to actually make a difference?"

Though networks such as WIN are a useful support for women already in the industry, the reality is that gender stereotyping – a large contributor to male dominance – stems from a young age and continues through education.

Gender stereotypes often help determine the subjects and industries women are expected to be interested in, and result in a severe gap between the number of women and men studying STEM (science, technology, engineering, mathematics) subjects.

About 60 per cent of Bachelor of Science students are female. But women make up only a quarter of

engineering graduates. Consequently, regardless of attitudes during recruitment and the desire to hire women, the number available to interview is typically lower than for men, a disparity that worsens as careers progress.

Hannah Woods is a recent graduate keen to belie that trend.

Now in her fourth year working for Fletcher Construction, including on major projects such as the Christchurch Rebuild and the Waikato Expressway, Woods was a nominee at the recent National Women in Construction (NAWIC) Awards.

Though out-and-out bias against female candidates is rare, Devlin says unconscious bias is still an issue. These constraints must be addressed by ensuring women are on recruitment boards, the value of diversity is conveyed to men, and diversity is put front and centre, in the same way health and safety is viewed in the

Infrastructure in New Zealand is one of our biggest investments for many years to come, and we need to ensure we have the best people possible in all our roles.

Margaret Devlin

industry.

For Devlin, diversity needs to not be "something out of the norm" but "business as usual".

Role models play a crucial role in this transition. The statement "you cannot be what you cannot see" rings strongly true for Devlin. She notes that one of the main benefits of the network has been profiling leaders across the industry to show women there are others like them to look up to. By sharing experiences and opportunities women can gain more confidence, she says.

Another way WIN drives change in the industry is through partnerships with large corporates. One such major partner is Kensington Swan. Several of its employees are involved with the organisation.

Senior Associate Ariana Stuart, who works on construction and other infrastructure deals inside the firm, is on the WIN national advisory board, and other employees are involved in local chapters. Stuart says Kensington Swan's involvement is a fantastic way to help drive change in the industry from within and underpin its own commitment to fair gender representation.

Devlin is quick to note that we should also focus on successes in diversity, and there has been progress on some fronts. At this year's Infrastructure New Zealand symposium, over 30 per cent of attendees are female.

WIN has grown rapidly in the past two years, with its events consistently well-attended and carrying a huge amount of energy that excites Devlin. Ultimately she hopes young women will step into the industry and not be afraid to use the support networks available.

Though Devlin's outlook is positive, to her the drive to solve the industry's representation issues remains important: "Infrastructure in New Zealand is one of our biggest investments for many years to come, and we need to ensure we have the best people possible in all our roles."

# Women making moves in infrastructure

## Ariana Stuart Kensington Swan

For Ariana Stuart, joining the industry as a law graduate at the height of the GFC brought its own set of challenges. She took on further study, before eventually getting interested in infrastructure, especially on procurement and project advice and dispute resolution. Since joining Kensington Swan in 2013, she has grown to specialise in resolving construction and infrastructure disputes, including currently working on the largest leaky building claim in the country. In recent times she's become interested in social infrastructure projects and is increasingly involved in performance bonds and litigation. For Stuart, her diversity comes not just from being a young woman in the industry, but also from her Type-1 diabetes, which she was diagnosed with as a child. Her position has allowed her to provide new insights and views. "Whatever situation I am in, I strive to provide a different perspective on this basis and challenge the 'status quo'". She says her diversity has encouraged her to foster a strong set of relationships, improving her access to opportunities in the industry. When not focused on work, Stuart finds time to sit on the national advisory board for Women in Infrastructure, giving her the opportunity to help other women in the industry.



## Hannah Woods Brian Perry Civil — Fletcher Construction

Graduating with a Bachelor of Engineering with first class honours, Hannah Woods was determined to seek out a career that was challenging, rather than roles that were more familiar, as a means of further enhancing her leadership skills and continuously improving. Currently working with Brian Perry Civil as a Quality Engineer, on an internal transfer within Fletcher Construction, Woods speaks of having had "a pretty good ride to date", and having been fortunate enough to "not face any blatant sexism". However, she recognises this is not the case for all women in the industry, and acknowledges the transition to a workforce representative of both genders is a slow one, particularly in leadership positions. "For example, on my project around 25-30 per cent of site to project engineers are female, but only 5-10 per cent at the tier above." She says education is a contributing factor, "The only reason I started looking into it as a career option is because a career quiz outlined it as a good option... Being good at science and maths I was generally steered towards medicine." Taking an active role in breaking down this barrier, Woods has delivered presentations to high schools to educate and encourage students to consider working in the industry.



## Amy Barrett Hawkins

As if juggling the giant workload of big infrastructure projects wasn't enough, Amy Barrett did it alongside raising a family. Now National Business Development Manager for Hawkins, she says leading Public Private Partnership (PPP) bids while also being a mum to two young children was the hardest job she's ever taken on. "Bidding PPPs uses every waking minute... All hard enough, but squeezing in time to feed babies, change nappies and read stories definitely took the challenge to the next level." While Barrett says, "it's no secret that the infrastructure industry has a reputation as an 'old boys' club," she sees the benefits in diversity. As "not your typical construction contractor," she's been able to build a more diverse network of connections, especially with clients in the public sector, where there is greater gender diversity. She says those stronger relationships have given her and Hawkins access to opportunities that might not have existed if she simply fitted the typical employee mould. Barrett remains passionate about the industry: for her, infrastructure is unique in its multi-disciplinary collaboration and its direct impact on people's lives, and she sees it as "one of the most exciting spaces anyone could work in".



## Michelle Qu Fletcher Building

When Michelle Qu was announced as a finalist for the National Association of Women in Construction (NAWIC) Excellence Awards in 2018, she was the first Chinese woman to have received such a nomination. Qu says that milestone meant a lot to both her and the Chinese community. When she entered the industry 12 years ago she was a migrant who spoke little English. "It was a matter of surviving rather than thriving". Today in her role at Fletcher Building she manages procurement packages worth over \$300m for the Puhoi to Warkworth project, one of the country's largest roading contracts. Qu came from a non-construction background, with degrees in cultural diversity and translation, and began her career in import-export, before using her expertise in international procurement as more New Zealand companies looked abroad for materials. She says her diverse background allows her to have an attention to detail, a willingness to adapt and a determination to succeed. She sees significant value in getting more women involved in her industry. "Women have a strong spirit, hard as steel, bringing determination, a hard-working ethic, and the ability to perform under pressure. A gentle charm, soft as water, bringing resilience, and flexibility."



## Parekawhia McLean NZTA

Working in a wide variety of roles, including being an advisor to three Prime Ministers, CEO of a major tribal entity, a successful business woman and director on a range of boards, Parekawhia McLean has found she's often been the only woman or Māori around the table. Consequently, she feels she's been able to provide different perspectives and has challenged the status quo in an industry where she is still under-represented in more ways than one. McLean served for five and a half years as CEO of Waikato-Tainui, where she oversaw the implementation of social, cultural and environmental initiatives across the iwi, and was also involved in the establishment of Maori TV. She says in all these roles she is motivated by the values her parents and grandparents instilled in her: hard work, compassion, persistence and humility. Now working in the senior leadership team for NZTA and impacting on NZTA projects and relationships in the Central North Island, she believes in investing not just in infrastructure, but in the next generation of leaders too. In her family, she gives guidance and support to her two daughters and nieces and nephews. And in her professional career, she takes time to mentor other Māori women to help them achieve their goals and dreams.



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# Chinese lessons for Kiwis

A capital injection will allow China's ICBC bank to invest further in New Zealand infrastructure projects

Tim McCready

**I**CBC NZ recently received an additional US\$60 million (NZ\$88.08m) capital injection from the bank's head office.

This new funding – approved by ICBC at a time where the global trade and investment environment has been subdued – is a strong signal of the bank's commitment with New Zealand.

ICBC NZ's chief executive, Karen Hou, says the additional capital will allow the bank to further invest in local infrastructure projects.

The bank has already invested across a range of industry sectors – including financing support to the banking syndication for Wellington's Transmission Gully motorway, several key pieces of infrastructure in the Christchurch rebuild, and hopes to do more in the near future.

"Infrastructure continues to be ICBC's main area of focus," says Hou.

## Selecting infrastructure partners

ICBC is present in 18 countries along the Belt and Road, loaning US\$78.6 billion against 288 projects.

Hou says this gives the bank strong capability in global infrastructure, which the bank can leverage for New Zealand projects.

She suggested the Government could establish specific standards for global construction partners, to identify and select the best global companies, including Chinese firms, to bring experience and expertise into the country from across a range of infrastructure classes – bridges, railways, motorways, schools, power and water – along with capital.

"The use of Chinese companies can make the cost lower relative to others due to labour, scale, and the cost of materials," says Hou.

"At the same time, Chinese technology, management and safety are world-leading.

"We should aim to bring the best from around the world to New Zealand – ICBC would like to assist to introduce and facilitate Chinese top players into the local market."

The bank is now assisting a delegation of New Zealand Infrastructure companies that plan to visit China next year, in order to learn from China's most advanced projects, central planning, execution and implementation methods.

"In order to deliver successful projects, it is important to select those companies that have significant global experience on major projects, as well as a good attitude towards environmental protection," says Hou.

## Making projects more attractive

Though the opportunity for infrastructure investment in New Zealand is significant, Hou notes that the return on projects can be very low and spread over a very long project recovery period, which can make banks cautious about lending.

She says that Chinese companies are interested in the New Zealand market, but they are facing some difficulties here that means they cannot bring their comparative advantage here. These include:

1. Project overruns and delay.
2. It is difficult for some Chinese construction companies to succeed when bidding on tenders, because there is a local experience requirement when you bid.
3. Despite winning a tender, some Chinese companies have to subcontract to local builders, and are unable to take advantage of using their own staff due to a lack of policy support for filling labour shortages that could help rapidly advance infrastructure projects.

Hou says there are opportunities for the Government to help make local infrastructure projects more at-



The use of Chinese companies can make the cost lower relative to others due to labour, scale, and the cost of materials.

Karen Hou

investment. If there is not enough money to repay the investment through the subway alone, the government can help by using other developments associated with the subway – such as the related commercial areas – to go towards the repayment of the project.

This way, getting resources for infrastructure projects is easier because the risk of repayment is lowered.

## Combining infrastructure projects

Hou notes that in New Zealand there are many significant infrastructure projects in development ranging in size.

"There is an infrastructure deficit in New Zealand that could be as high as \$30 billion," she says. "Individual projects might range between \$200m and \$3b, but if smaller projects are combined then it could significantly lower the overall cost."

She says Chinese construction companies are unlikely to be attracted to New Zealand to undertake one small project.

"Generally, small projects will only attract the small companies, not the high-end companies. In order to attract the biggest and the best to come here, there needs to be a clear pipeline of large projects that will justify bringing people and equipment to this country."

## Wuqing: satellite city opportunities

ICBC NZ chief executive Karen Hou is keen for New Zealand to consider inter-city transportation links, such as the line between Beijing and Tianjin that has cut travel time from three hours to around 30 minutes.

"A satellite city provides many infrastructure projects," she says. "Not only the transportation network between cities, but also development of areas around and along the transportation network."

Hou says by combining these developments together, the project scale becomes much larger and is

more attractive to some of the biggest and best global developers.

One example of this is Wuqing, a satellite city located 70km from Beijing. The Beijing-Tianjin high-speed rail service was introduced in 2008, and includes a one-minute stop in Wuqing.

Wuqing used to be a transport hub, carrying cargo to Beijing along the Grand Canal. But the rise in railway and roading meant until the high-speed rail service was introduced, opportunities in the city were limited.

Since then, Wuqing has been propelled into an important satellite city, attracting more than 8200 projects from Beijing over the past five years, totalling 51.6 billion renminbi, according to the district government.

The city is just 24 minutes from Beijing which makes commuting for work feasible, and it has opened the city up for significant new infrastructure development, offering far more affordable housing options than in Beijing or Tianjin.

tractive.

"The Government may choose to partly invest alongside private companies," she says.

"They could also introduce preferential policies that help support the infrastructure or provide a bottom line for future investment repayments."

"If the project can be structured well and can balance reasonable returns and a mitigated risk, then it will become very attractive."

Hou gives two examples of how the Government can help – the BOT public private partnership (PPP) model, and combining smaller infrastructure projects together.

## BOT model

The BOT (build, operate, transfer) model is one of the most popular PPP models used in China for delivering major infrastructure projects.

Under the BOT model, the government uses the private sector to de-

sign, build and run an infrastructure project. After a period of time the asset is transferred back to the government.

This structure relies on the private sector, but the government supports the private sector to help with regulatory hurdles and ensuring the repayment of the investment makes the project worthwhile.

As an example, when establishing a subway: the cost is designed from the outset, including how to repay the

# One piece of the solution puzzle

Auckland has a huge appetite for foreign investment to help fund its infrastructure needs, from transport through to urban development and tourism. The Herald put some questions to Ateed CEO Nick Hill who recently accompanied Auckland Mayor Phil Goff to Japan to talk with potential investors.

**What do you see as infrastructure priorities and challenges for Auckland from Ateed's perspective?**

**Hill:** Our role is to work with the wider Auckland Council group to support infrastructure priorities which have been clearly spelled out by Mayor Goff – particularly housing and transport, and in areas where the region's recent excellent economic growth has not been shared. Our purpose is to support the creation of quality jobs for Aucklanders, particularly in the south and west, where Auckland's economic growth has not reached as much as other areas.

We help activate parts of Auckland where investment is going in, with Manukau being a priority. We're a piece of a large solution puzzle, with council agencies including Panuku Development Auckland, and Auckland Transport which have huge infrastructure projects.

Through attracting the right infrastructure investment – such as urban redevelopment in focus spatial areas, and in sectors which require new infrastructure such as tourism – Ateed can help influence investment in where quality jobs will be.

Large-scale development requires

innovation in solutions and delivery, and industry capability – people infrastructure. It's well known there is a significant shortage of skilled construction workers, and also in the tourism sector. Ateed is working with industries to bridge skills gaps, and with training institutions and government agencies to remedy supply shortages.

**You've been to Japan with Mayor Phil Goff, NZTE and others to look at infrastructure investment. What are the learnings from that trip?**

**Hill:** When visiting the big trading houses, and presenting to the three targeted investor group workshops, we found an elevated appetite from business people and investors in Japan to learn more about opportunities here, and we learned what we need to do to ensure the momentum isn't lost. We need to be very clear about our investment narrative as a region, and it was a quick immersion course in how to effectively convey the great opportunities across Auckland. The value of the Mayor being part of the delegation and of our long-standing sister city relationships can't be underestimated for their value in opening the right doors to allow us to talk to the right people. The business



system in Japan is more similar to ours than some other Asian countries, which is also significant.

The fact we are projecting significant demand for investment over the next 10 years, and that Auckland Council is investing \$26b, creates clear demand. **How applicable are those learnings to Auckland?**

**Hill:** The reality is that foreign direct investment is not just about the money. Investing companies can deliver competitive advantage through technology and expertise, and Japan is a global leader in construction and higher-density urban development techniques. It's clear that our innovation in that space is decades behind Japan. Their development of hydrogen-energy technology is eye opening, and we need to tap into that through inbound investment. It's well documented that Auckland has a housing shortage of up to 55,000 houses, with future population growth meaning the region may require 400,000 new houses by 2041. About

half of the KiwiBuild houses are expected to be in Auckland. Japan can offer us a huge amount in terms of smart urban development investment. And it's not just about housing our population. It's about how we will move around the city and how our waste will be disposed of. Japan has significant experience and capability in developing transport hubs with commercial, residential, retail and public amenity.

**Auckland has two big events in 2021: The America's Cup and Apec. The Park Hyatt is close to completion. What else is required in the destination infrastructure space and what are hotel investors looking for?**

**Hill:** We are working with the Government, the wider council – particularly Panuku – and industry to understand what exactly will be required. We know, for example, that about 10,000 delegates and 3000 media may come to Auckland for Apec Leaders Week.

The current projections are that we should be able to meet demand for hotel rooms in 2021. But looking beyond that, by 2025 Auckland is projected to welcome more than 4 million visitors a year (58 per cent more than now), and that means a projected shortfall in hotel rooms by then. Auckland is investing in a number of infrastructure projects located in the central city and waterfront area which will be complete or well advanced by 2021, such as the City Rail Link. We know that the New Zealand International Convention Centre will be up and running by 2021, and that's a hugely important component in what Auckland can offer in terms of business events in conjunction with Apec and the America's Cup.

The recently announced estimated \$250m Hotel Indigo Auckland, which we played a significant part in bringing to Auckland through the NZTE's Hotel Investment Attraction Project that began in 2016, gave us good insight into what hotel investors are looking for. Our investment specialists worked closely with Ninety Four Feet, the Australasian company building the hotel, for more than a year to help it understand Auckland's visitor economy data, navigate the nuances and cost structure of the commercial property market, and put together a business case that stacked up. We also helped the company find the right site, crucial for a premium hotel.

Auckland is projected to need an additional 1000 rooms by 2025, and we're currently at around 85 per cent occupancy, so there's specific interest from Japan in hotel investment opportunities.

● *Nick Hill is chief executive of Auckland Tourism, Events & Economic Development (Ateed)*

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Light rail has been proven globally to provide the kind of permanent infrastructure a successful and growing city needs.

# A light rail centrepiece

New Zealand Transport Agency chief executive **Fergus Gammie** outlines the agency's big agenda

**S**ignificant investment in Auckland's transport system over the next decade will transform the city and help underpin its continuing growth as a vibrant and diverse place to live and work. At the heart of that transformation is a rapid transit network that will be developed across the city to give people more travel choices and ensure the city is fit for the growth that lies ahead.

Light rail is the centrepiece of Auckland's rapid transit future. While it's new for us, light rail has been proven globally to provide the kind of permanent infrastructure a successful and growing city needs – better connected communities, attracting investment for new developments and access to affordable housing.

Improving the rail network will contribute greatly to the urban development along the corridors where light rail will run, creating new communities around stops, through housing development and providing more transport choices. Communities on the corridor will have the option to move from being car-dependent to embracing public transport with all the benefits that brings.

It will provide sustainable connections to the city for new communities, enabling the growth and further development of Auckland, particularly in the west and northwest. More houses can be built close to public transport giving critical access to jobs, health, education and recreation.

Two routes have already been identified – City Centre to Māngere, and City Centre to Northwest. Together these two corridors will connect communities, help reduce bus congestion in the city centre, unlock significant growth potential, and provide better access to growing employment areas including the CBD and Auckland International Airport.

Light rail is a game-changer for Auckland and the Transport Agency is determined to deliver the very best. We're looking for new and innovative ways to procure, deliver and finance this project and we're looking for the best ideas from around the world.

A critical key for success will be the active engagement and participation of the construction and infrastructure and finance industry, here and overseas. It is never too early to



Fergus Gammie

tap into the industry's proven track record for innovation and ideas. We are keen to seek its input to ensure a great result for Auckland – we're committed to developing services that meet people's needs.

Earlier this month the "house full" sign went up in Auckland when more than 450 people representing some 200 national and international companies attended the Transport Agency's briefing on the procurement process for the project.

The project is being developed at pace and we will meet interested companies over the coming weeks ahead of the first stage of the procurement process for professional services kicking off next year.

Ultimately this is a project for Auckland and Aucklanders. Keeping that front of mind is important to ensure we can achieve the best possible outcomes for our key stakeholders, residents and businesses.

#### What's on the horizon?

Changes to New Zealand's land transport system are not confined to Auckland and its light rail network. It is far more profound, and impacts on the way the Transport Agency works and its relationship with contractors and suppliers, local government and other stakeholders. We are finalising our new National Land Transport

Programme (NLTP), which sets out its investment programme for 2018-2021 and will reflect the priorities of the new Government Policy Statement (GPS) for land transport.

The Government Policy Statement has greater focus on encouraging people to use public transport or active options for travel – walking and cycling – more effective use of land and better connections between the places where people live, work and play.

Importantly, the value of transport investment for the next three-year cycle will remain around \$4b annually – although there will be a different mix of outcomes.

There will continue to be a sizeable programme, with the nature of the next investment programme resulting in a greater proportion of small-to-medium-sized works with a wider geographical spread.

It is important that the industry thinks more broadly about the investment programme across the entire transport sector, not just the state highway network.

The Transport Agency's focus will be on projects with strong outcomes relating to safety, better access to all forms of transport, and resilience to keep communities, people and businesses connected.

There are knock-on effects for the

industry as well which underline the need for it to adapt and keep on the front foot.

Though some proposed roading projects are being re-assessed, we want to repeat assurances from the Transport Agency that it will continue to complete projects that have already been contracted for construction.

We recognise that in the immediate term, the infrastructure/contracting industries need to have advance visibility of the pipeline of work ahead.

The Transport Agency has a strong and transparent relationship with the transport sector. We'll continue to work closely with stakeholders to keep them informed of the pipeline of work coming to market.

Once NLTP is confirmed, the Transport Agency will start a series of industry roadshows throughout September and October to share with the industry its programmes of work for the next three years.

There are still a number of major projects that are or will be getting under way. Along with Light Rail, this includes accelerating the construction of the new Manawatu Gorge route, and Auckland's State Highway 20B, which will upgrade the eastern access to the airport.

There is also likely to be a large programme of safety projects that will be packaged up.

#### Broader range of opportunities

There will be significant NLTP investment in active travel options – walking and cycling programmes. There will also be a whole suite of cycling and walking projects that the Transport Agency and local government are developing together.

The Transport Agency is working with Local Government New Zealand to bring forward a range of other projects: safety on local roads; improving the effectiveness of public transport; improving network resilience; regional improvements.

We will continue to explore other opportunities of joining its programmes with those being developed by local government.

Safety is a strong focus of the next NLTP and we are looking at ways we can have smarter procurement processes by packing these works together.

#### Getting ready for the future

Technology is redefining entire industries, including just about every nook and cranny of the transport sector, too.

Vehicles are loaded with more information-carrying sensors and the levels of assistance to help safer travel; New Zealand is seeing a shift to electric-powered vehicles; the transport system already in place is better managed; smart phones and tablets are transport tools providing easier access to travel to help people find the best way to plan their journey.

We are committed to working across the transport sector and beyond to harness and develop new technologies that will benefit all New Zealanders.

Earlier this year, we established the Land Transport Future Digital Technology Group, which includes key influencers and decision makers from both the private and public sector.

Membership is about as broad as the technological revolution itself and includes among others companies that deliver infrastructure, a supermarket chain; local government; those representing telecommunications; transport organisations, and ITS New Zealand.

The group represents an opportunity to work together to shape a future transport system through a well thought out plan of technology-related investment that will focus on what people and business want; is affordable; includes all transport and travel options; is safe, responsive, and sustainable; and supports innovation.

The key will be linking infrastructure with the way people live, their communities, and with the services we provide in an integrated way.

It is not something that has been done well in the past, but it is something that New Zealand must be better at in the future.

The challenge for the Transport Agency and the wider sector is to modify the traditional way of working to make the most of the opportunities the future holds. This must be done without losing sight of the commitment to put the people of New Zealand at the heart of everything we do to deliver a connected transport system that is world class.

# Transformation set in train

**W**hen around 500 NZ and overseas supplier industry representatives recently packed out a NZ Transport Agency briefing on Auckland's light rail plans, it would seem they sensed something big was in the wind.

Or was it just curiosity – to see whether the Government's announced plans for a rapid transport network in Auckland were for real and going to be quickly converted into runs on the board?

"We want the best and brightest in the industry to be part of this first for New Zealand, our largest ever infrastructure project," NZTA head Fergus Gammie informed the gathering.

Early market engagement will help establish a robust and open process to ensure all options for procurement and financing are considered in the delivery of what Gammie says will be a world-class rapid transport system that benefits Auckland and the rest of NZ.

The NZTA, through its independent board and new chair Michael Stiasny, has been given the responsibility by the Labour-led Government for leading the delivery of light rail and will be the decision-maker on the project.

There are three project partners, Auckland Council (AC), Auckland Transport (AT) and HLC (Houses, Land, Community).

HLC is a wholly-owned subsidiary company of Housing NZ tasked to deliver the Auckland housing programme. A key role will be delivering housing development opportunities to support urban growth along the proposed light rail routes, particularly in Māngere and Mt Roskill.

As custodians of the Auckland Unitary Plan, AC's role will be to lead the urban development framework,

The roll-out of light rail across Auckland is set to dominate the transport debate for the foreseeable future, writes **Tony Garnier**



Michael Stiasny is the new chairman of the NZTA.

It will be the job of NZTA to make light rail happen, more or less in a parallel to its responsibility to Government to design, build and manage Auckland's motorway network.

planning and decision-making regarding corridor land use to optimise development opportunities aligned with light rail, as well as responsibility for regulatory consent.

AT's specific role will be to prepare a Rail Safety Case for NZTA to review and approve, and to input practical and customer-centric "whole of transport system planning, design and operations".

Two government agencies also have key roles. The Ministry of Transport will lead legislative amendments needed to support light rail. Although

NZTA will be responsible for preparing the business case for light rail, Treasury will advise on budget/appropriations – affordability, core Crown debt, value for money – and also public-private partnership (PPP) options.

The seeming complexity of the governance arrangements involving multiple agencies, roles and responsibilities – against the obvious business-like option to establish a single dedicated special purpose vehicle (SPV) "Auckland Light Rail Ltd" company, as has been done for the CRL project – suggest a project with a high level of risk.

The bottom line, however, is clear. It will be the job of NZTA to make light rail happen, more or less in a parallel to its responsibility to Government to design, build and manage Auckland's motorway network.

The outcome or legacy Gammie is wanting NZTA to create is to make light rail a key part of an integrated public transport system that links communities and supports their development.

Against the scale of big infrastructure Auckland has built over the past 70 years – Harbour Bridge, Airport, motorway network and tunnels – Gammie envisages the light rail rapid transit network in Auckland will be unparalleled in its size, cost and ambition. "It is set to deliver a public transport network and urban development transformation that will focus and connect the city's growth for decades to come."

continued on D18

## Getting to the airport quickly

Light rail as a primary mode for getting to Auckland Airport appears to be off the table. Instead, NZTA is designing the light rail system primarily to link communities and support their growth and development as places to live, work and play.

That's how successful light rail services have been developed in other cities, and the change of emphasis away from encouraging use of light rail as a service for getting to/from the airport makes sense. Who wants to lug suitcases, kids, surfboards and golf clubs on a suburban light rail service, which in peak hours is crowded with workers and stops frequently?

Passengers come to the Airport from across Auckland and beyond. There is a 45-minute bus service from the city centre, and a dedicated service from North Shore and Manukau. The opening of the Waterview Tunnels has helped North Shore people travel directly to and from the airport.

The Government wants rapid bus services from the airport to connect to the main trunk rail at Puhinui in time for the America's Cup and Apec in 2021. With the bus taking 10 minutes, and an efficient connection to a train, the total trip time is projected to be around 40 minutes. Long-term a rapid transit (bus/light rail) service from the airport to Botany and Howick is planned.

If Auckland is serious about providing rapid transfer service, a dedicated line will be needed. London has introduced a rapid train service that takes 15 minutes to Heathrow against the 70 minutes by conventional rail and hour by bus. EU cities have started building direct rapid rail services.

# LIGHTING UP THE CITY WITH SMART ENERGY TECHNOLOGY



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# Making fast tracks to the city

continued from D17

The initial network will comprise:

- A light rail line from the City Centre (Britomart) to Aotea Square, Mt Roskill, Onehunga, Māngere Centre and Auckland Airport employment precinct.

- A western light rail line from the City Centre to Aotea, Karangahape, Lincoln Road, Westgate and Kumeū/Huapai.

An adjunct project includes a rapid bus priority route (future-proofed for rapid rail) from the airport to Puhinui train station by 2021 (linking to train services to the city centre), and extending by 2030 a rapid transit service from Puhinui to Botany and south-eastern suburbs (see separate Airport access story).

The Government has already committed \$1.8b in seed funding to progress the network within 10 years and left open the possibility of private funding – a much bigger capital investment will be needed, likely to be around \$6 billion-plus judging from the cost of other city light rail systems.

The NZ Super Fund has put its hand up to build, operate and own the light rail system. It has put forward an unsolicited proposal to form an international consortium of infrastructure investors to carry out the work with CDPQ Infra, who are developing Montreal's 26-station light rail network, as a proposed partner. But there are no promises the Super Fund proposal will be accepted – and that's far from the end of the project's procurement story.

First, other interested parties have also been invited to express their interest and provide suggestions for a procurement process and the factors they believe are critical to the project's success.

NZTA indicates it will develop a process to assess those proposals.

Second, a business case for the City to Māngere and City to Kumeū projects is under way which includes identifying the opportunities that integrating light rail with urban development enables. Project notes indicate that both the project cost and timing for delivery will become clearer as the business case and procurement strategy progresses.

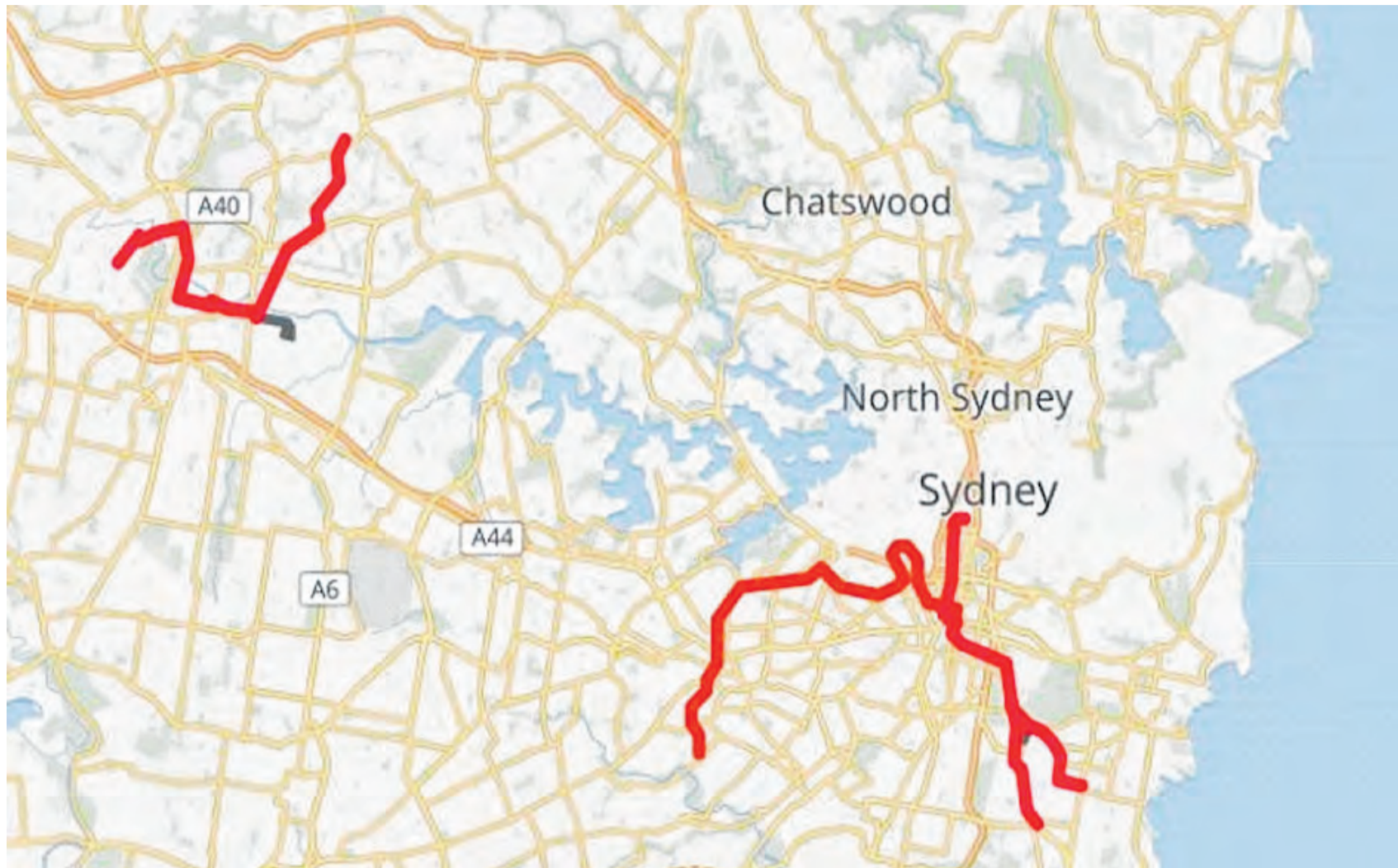
Third, the full scope of the project is dynamic and a work in progress.

Extending the western light rail corridor from Westgate to Kumeū reflects the fast-paced housing growth and congested roads in this part of Auckland – with a further 25,000 homes projected by 2032.

Similar logic applies to the faster-than-projected housing growth occurring in the Unitary Plan's designated Silverdale-Dairy Flat-Wainui precinct, including Whangaparāoa Peninsula.

In a recent report, council chief economist David Norman notes that total dwellings consented are up 27 per cent compared to a year earlier, with almost all the growth in the four areas designated for intensified housing and business growth – Drury, West Auckland and Silverdale and long term Warkworth.

He notes people by and large prefer to live closer to jobs, infra-



**Sydney's light rail: Existing inner west route and CBD and South East light rail, expected to be opened next year.**

## Lessons from other cities

There are around 60 cities worldwide with light rail systems integrated with other public transport services. Most started this century and most are extending further into city suburbs because patronage has outstripped planning predictions.

NZTA wants Auckland's light rail to be of a comparable standard to those in cities like Sydney, Melbourne, Portland and Manchester. There are lessons for Auckland from these and numerous other cities that have established and are expanding light rail systems:

- **Sydney** – Took from 1991 to 1997 to build a 12.8km line with 23 stations. In its first year, 2010/11, it attracted 2.7 million passengers. In 2016/17, passenger numbers were up to 10 million. Run as a PPP and despite a cost blowout from \$1.5b to 2.1b when it opened, two further lines are under construction, one is due to open this year and a further four lines, including a new system connecting suburbs in western Sydney.

- **Manchester** – Took from 1982 to 1988 to decide to build a light rail system which opened in 1992 on 30km of converted rail track. The immediate success of the system has meant expansion has been a key strategy of Greater Manchester

planners, with a programme of 5 phased extensions under way to provide 92km of light rail track.

- **Denver** – A car-choked city that overcame years of distrust by opening 8.5km of light rail in 1994, and now has eight lines that cost US\$7.6b with 76km of track with extensions planned. Run as a PPP it combines private funding, local tax dollars and state and federal grants. And it happened, says Colorado Governor John Hickenlooper (who championed the systems extension in the early 2000s), because Coloradans were willing to set aside crippling rivalries and make some big collective investments in themselves.

- **Phoenix** – Approved in 2000, construction of a 32km line started in early 2005 and opened in 2008 with 28 stations. Part of an integrated metro public transit system, linking three cities of Phoenix, Tempe, and Mesa, the system has been extended to 42km with 35 stations. Seven new lines are planned in a phased construction programme out to 2034. The system is funded through state and federal money, a sales tax and around 44 per cent from fare box revenue – one of the highest in the US's light rail system – and is branded as “a machine to transform urban life”.

- **Gold Coast** – Proposed in 1996 and opened in 2014, patronage on the 14km system costing about Aus\$1.6b has grown from 6.3m in 2014/15 to 8m in 2016/17. Run as a PPP consortium of 5 major transport and financing groups, 4 extensions are under way or planned that will add a further 20km of track. Revenue includes taxes generated from property values uplift.

The messages for Auckland are clear: Expect cost blowouts, but also higher than projected patronage. With Auckland's population on target to be above 2 million by 2030 and 3 million by 2050, if light rail is to be used as the public transport and urban transformation vehicle for Auckland, then a long-term vision, strategy and roll-out would seem to be required.

The construction industry would also welcome the certainty of seeing a confirmed pipeline of work for the next 10-20 years. Or should they be like most other Aucklanders and take a chance that Auckland is finally getting past its decades of transport debate and committing to ongoing forward-thinking and ambitious action to build a world-class integrated transport system that links roads and public transport?

– Tony Garnier

structure that works, public transport, schools, shops and other amenities. As a result, developers are showing a preference for delivering development in brownfield areas.

“This highlights that people value rapid transit access, and that develop-

ment enabled by the unitary plan is responding,” says Norman. But as every Aucklanders knows, the existing transport infrastructure serving these areas is already heavily congested.

Using Norman's logic there is a clear demand – of similar magnitude

to the case for the western corridor extension to Kumeū – for a rapid rail line to the North Shore, extending to Silverdale and possibly Warkworth and taking advantage of the long-proposed third Harbour crossing. The North Shore busway is already

future-proofed for rapid rail, and could be included in the proposed widening of the Northern motorway from Albany to Silverdale to help ease the traffic congestion now creeping well into the working day.

Like Kumeū, a further 27,000-plus houses and 100,000 residents are planned in the Silverdale area over the next 30 years.

The point: Auckland's under-planning against its fast-paced growth curve is legendary. It happened when we built the Harbour Bridge in the 1950s, requiring clip-on lanes from day one. It happened when provision for public transport was removed from the motorway network proposed in the 1960s, and tramways were ripped up. It has happened on the Central Rail Link (CRL) project, with stations not having enough platform length to cope with demand for longer trains.

The CRL example appears to have been rescued just in time.

Without a bit more foresight in light rail planning, could Auckland be about to make the same mistake again? Will we fail to learn from the experience of numerous other cities that have short-changed their introduction of a light rail system and are now playing catch-up big time?

If light rail is to be Auckland's 21st century transformational circuit breaker, let's put all our cards on the table and commit to do the build once and do it properly.

We are heading to become a city of 2 million-plus by 2028 – almost 10 years ahead of projections made as recently as 2010.

Our grandchildren deserve to be given a legacy they would like to thank us for and not be yet another generation of Aucklanders whose lives become pre-occupied with “catch-up” and fixing past failures.

● **Tony Garnier is an Auckland-based business consultant.**

## What's driving worsening congestion and the accident rate?

Congestion and safety have both been heading the wrong way, leaving many scratching their heads for an answer.

A quick look at road data and the reason is clear. Far from building too much road, we have built too little – or more precisely, our rapid population growth has outstripped our investment in roads.

In 2008, New Zealand had 175,569 lane km of road. We now have 179,079km. That's an increase of 2 per cent.

However, New Zealand's population grew by 12.5 per cent over the

Aucklanders will drive around 1 billion more km on the state highway network this year, 21 per cent more than a decade ago.

same period. So we have many more people now per km of road than a decade ago.

More people doesn't necessarily mean more driving – especially given there's been a material increase in public transport investment.

A better metric then is “VKTs” – vehicle km travelled, or how far all New Zealand vehicles in total travelled each year.

This number increased 11.7 per cent between 2008 and 2017.

The numbers suggest a fraction of road was built as would be required to keep the ratio of vehicles to road

length constant. More driving on relatively less road is what drives congestion and increases risks.

But this is only half the problem. In Auckland, population increased 11 per cent between 2007 and 2017 but under 4 per cent more lane km were built over this time.

Population growth has outstripped roading by a factor of almost 3.

Even worse, Aucklanders will drive around 1 billion more km on the state highway network this year, 21 per cent more than a decade ago.

Yet NZTA data shows state highway lane kilometres have increased

less than 5 per cent over the same period (from 1177 in 2007 to 1228 in 2017), despite investment in motorway improvements.

This is why Auckland is getting more and more congested, drivers more frustrated and roads less safe. It's not more roads that are the problem, it's more vehicles per km of road.

With growth at current levels we are heading to gridlock within a decade unless we deliver a step change in investment in public transport and roads and introduce road pricing sooner rather than later.

– Stephen Selwood

# Resilience in a changed world

Today, with our increasingly digitised, electrified lives we need electricity to heat our homes, pump our water, run our businesses, power all our various technologies and, increasingly, drive our vehicles. And with the predicted surge in electric vehicles (EV's) and electrified public transport yet to occur, this electricity dependence is only going to go in one direction.

Infrastructure resilience has always been a challenge in New Zealand. We live in a long, thin, sparsely populated and earthquake-prone country with difficult terrain, which makes redundancy economics difficult for infrastructure providers. That said, the reliability of Auckland's electricity network currently sits at 99.7 per cent, which compares well on a global basis and has met consumer expectations throughout many decades of Auckland growth.

But the challenge is to ensure we keep making the right investment choices for consumers to meet future expectations.

To do that it needs an informed public discussion of all the resilience options available, so consumers better understand the necessary trade-offs between costs and quality. And it needs a shared view of resilience that involves council, consumers, and government as well as the end-to-end electricity system.

Compounding the rising criticality of electricity is the impact of climate change being felt in New Zealand. As part of its future planning, Vector has had a close look at what climate change might mean for Auckland. This work was undertaken by EY and outlined in *The Physical Risks of Climate Change* report, completed in November 2017. The EY model projects the number of hours with wind in the 70-80km/h range or upwards will increase significantly. This will likely mean a big increase in the duration of outages, customer minutes lost, and numbers of customers affected.

Climate change also means we must factor an increase in the number of "1 in 100 years" extreme weather events and an increase in the risk of drought, with the consequent impact on New Zealand's lake levels, so critical to our energy supply. We expect to see increased erosion, with slips impacting infrastructure. That's why a system wide view of resilience and operating more sustainably is a critical need for New Zealand, and why Vector has committed to being net carbon zero by 2030.

This combination of climate change and the rising consumer expectations means more complexity for infrastructure companies, such as Vector. The big question is: how do we ensure a more resilient electricity network, which is built on assets with a life span of many decades (that in most cases predate



It's fair to say that in the list of things we simply cannot live without, electricity ranks right up there with food, water, shelter, and sewerage – closely followed of course by Wi-Fi and Netflix, writes **Simon Mackenzie**



the digital era), that can respond dynamically to these new challenges?

Today, Vector already spends the maximum amount it has been allocated by the Commerce Commission for network maintenance and resilience. To spend more, we would need a new level of expenditure approved by the regulators, as investments in the network are recoverable through regulated lines charges that make up a small component of your electricity bills. But if we spend too much, there is a risk of "gold-plating" the network. This is what happened in Queensland where resilience concerns were met by over-investment and subsequent over-billing, which was called out in the recent ACCC report on Australia's electricity market.

That said, there are a range of choices for delivering resilience solutions, including overlaying physical assets with digital technologies and network "smarts", replacing traditional power poles with aerial bundled conductors, improving tree management processes, facilitating faster take-up of distributed energy such as solar and battery, using real time network performance data from smart meters, delivering micro-grid solutions or household or community generators, using demand response measures, or continuing to underground the network where it makes sense.

Undergrounding is not however a "one-size fits all" option. Vector's network is already 55 per cent underground and most new parts of Auckland

**NYU's microgrid helps keep it afloat during Hurricane Sandy; power lines brought down by a falling tree in Auckland.**

land are undergrounded as they are built. This compares well with the New Zealand average of 27 per cent, or with other cities such as Sydney (35 per cent) and Melbourne (40 per cent). But undergrounding the remainder is costly – we estimate near \$5 billion – and, ultimately, that cost would need to be borne by consumers.

Cost aside, undergrounding is not always the optimal solution. Repair times are substantially longer, and undergrounding cannot ensure resilience against flooding, earthquakes, volcanic eruption or even trees falling in strong winds and uprooting buried services. It raises the question, would those costs be better employed on new technologies and distributed energy solutions, such as solar, battery, and vehicle-to-home technology that uses EV's as mobile energy sources.

More immediately, improving tree management is critical. The ferocious storm which hit Auckland in April 2018 brought down thousands of trees. Under the Electricity (Hazards from Trees) Regulations 2003, only a limited area around lines can be trimmed, and after the first trim, it is the responsibility of the tree owner.

Newer tree regulation can help but

so can consumers. Tree-owners, including households and councils, should be aware of their obligations. We love trees, but trees that interrupt the security of your electricity supply are a problem, and we don't think it's fair for all consumers to bear the cost of tree damage if tree owners aren't doing their bit.

In the end, electricity resilience is all about a future that avoids "gold-plating" the network, leverages new energy technologies, delivers more targeted customer-focused solutions and reduces cross-subsidisation. It's about getting the balance right on all the trade-offs and delivering the best resilience solution in the right place at the best cost to consumers.

- *Simon Mackenzie is chief executive of Vector*
- *Disclaimer: The results of EY's work, including the assumptions and qualifications made in preparing the report, are set out in The Physical Risks from Climate Change Report of Findings for Vector Limited dated November 2017. The report has been prepared for Vector. EY disclaims all liability in relation to any other party who seeks to rely upon the report or any of its contents.*

## Resilience solutions around the world

Across New Zealand, varying factors such as climate change, population density and geography mean there is no one size fits all solution for resilience. Targeted solutions are required, but raise serious cross-subsidisation issues, as some areas will require more costly solutions. These examples illustrate the options.

### Auckland – a tale of two lines

In Henderson, a network solution has been implemented with back-up lines that can be switched to provide power when there is a fault, offering 100 per cent redundancy. In Piha, 25km from Henderson and supplied by a single overhead line through the Waitakere Ranges, the low population density does not support the cost of a secondary line or undergrounding. Alternative solutions must be considered including local generation – renewable (solar, wind) or diesel, but able to run independently from the network, or local storage via a battery, which acts as backup supply and could be supplemented with generation.

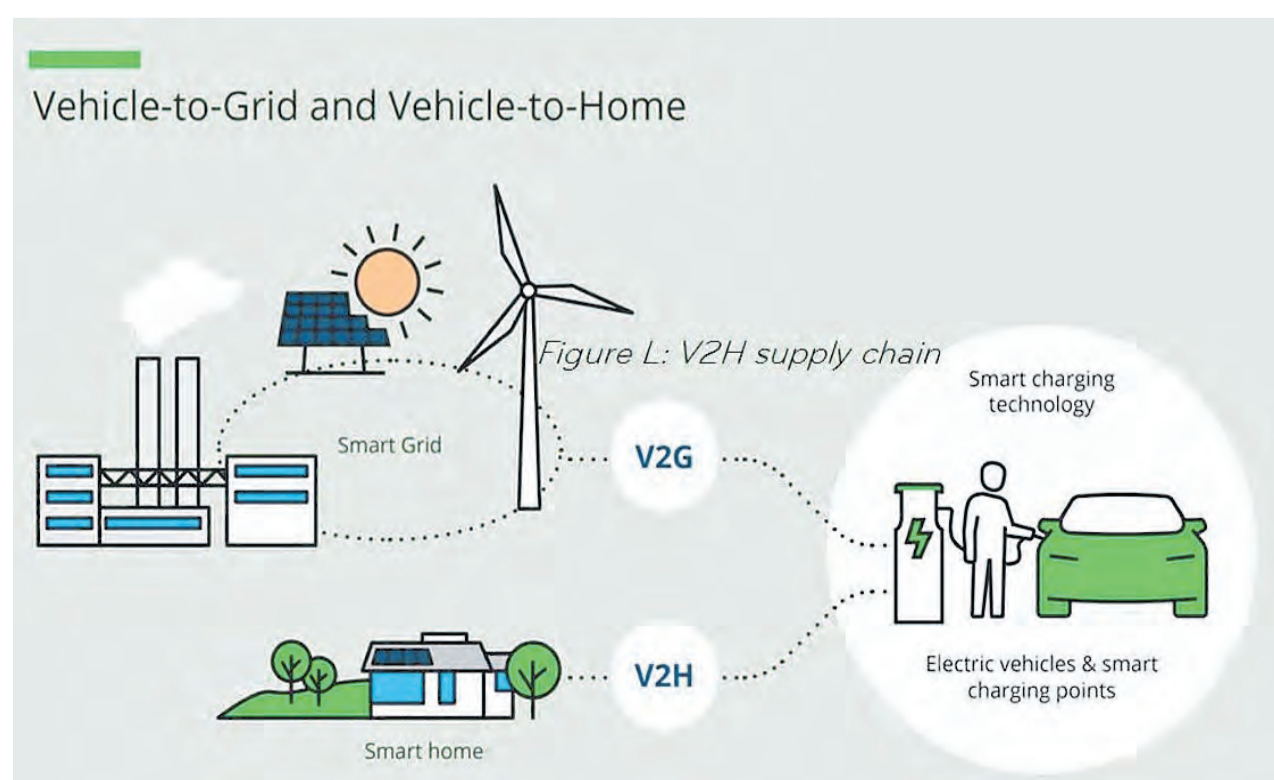
### Japan – new tech solutions

Vehicle to Home is an innovative solution that allows customers to supply their home with energy stored in a compatible electric vehicle enabling a cost effective, non-network alternative to increase resilience (see below). With a 28kWh Nissan Leaf EV, a household could supply a 3kW load for more than nine hours and a 6kW load for more than four hours. Customers can integrate V2H units with their solar and battery installation to obtain greater resilience, especially during network outages. Japan has more than 6000 solar integrated-V2H units in operation. Vector is the only utility in Australasia trialling 3kW and 6kW V2H units; and with access to Nissan's upcoming solar integrated-V2H technology for the Australasian market.

### New York – microgrids

In 2012 Hurricane Sandy plunged much of the city into darkness as flooding cut power across the network. But there was one notable exception. During the darkness, NYU remained brightly lit thanks to its microgrid, which continued to produce its own electricity. This was captured in a striking photo, and has proven to be a point of inflection for the city, with microgrids increasingly seen as a useful resilience tool. Vector is exploring their suitability for Tapora and Kawakawa Bay in Auckland.

## A new age solution — Vehicle to Home (v2h)



V2H is an innovative solution that allows customers to supply their home with the energy stored in a compatible electric vehicle (e.g. Nissan Leaf), enabling a cost effective, non-network alternative to increase resilience that gives the customer choice and control.

Using a 28kWh Nissan Leaf EV, a household could supply a 3kW load for more than nine hours and a 6kW load for more than four hours.

Depending on the installation type, customers can integrate V2H units with their solar and battery installation to obtain greater resilience, especially during network outages.

Japan has more than 6,000 solar integrated-V2H units in operation. Vector is the only utility in Australasia trialling 3kW and 6kW V2H units; and with access to Nissan's upcoming solar integrated-V2H technology for the Australasian market.

# Experts debate options

## How to shape the right future

### The time is now

"It's great to see activity across the infrastructure sector and encouraging to see new models coming to the fore, so now is the time to address key questions and challenge how New Zealand can best deliver the infrastructure we need," says Sinclair.

"We should be asking if the existing tools, such as contract models and procurement rules, are fit for purpose, to encourage the best bids and partners to deliver the projects?"

"We see the value in an independent body providing arms' length advice to assist infrastructure decision making at a national level.

"We see independent agencies overseas, such as Canada and the UK, operating as centres of excellence and expertise, building on existing knowledge and working with governments to integrate thinking, build consensus and create better outcomes."

Sinclair says the opportunity for New Zealand to get considerable value from this approach is high.

"You don't have to look too far to find where an independent agency could add expertise and value.

"For example, consider light rail and its role as an urban regeneration project, the current debate on water infrastructure and the infrastructure pipeline for transport and health," says Sinclair.

"The Government knows what it wants to achieve, and it's critical that projects are delivered efficiently to provide value for money for New Zealanders.

"An independent infrastructure body could really shift the dial to help make this happen."



### What could this body look like?

Fail says an independent infrastructure body, funded by government and employing people full-time, is a good starting point.

"There's always the risk that setting it up might be seen as more bureaucracy. However, in our view it would be worthwhile as it would free up officials and lead to wider-ranging opportunities to generate ideas and efficiencies," he says.

The body would need a clearly understood purpose and roles, such as those underpinning successful organisations overseas like Scottish Futures Trust, and it needs to be staffed with the right experts.

"The ability of an independent body to think long-term and create institutional expertise, take learnings from overseas where useful, means it could play a highly supportive role to central and local infrastructure providers."

### Sinclair and Fail say that three game-changing priorities should be the focus of the independent body's first 100 days.

#### 1. Develop new funding models

"How we fund projects is front of mind for the infrastructure industry," says Fail.

"New infrastructure funding

MinterEllisonRuddWatts' infrastructure partners

**Sarah Sinclair** and **Tom Fail** are supporting calls by

Infrastructure New Zealand to establish an independent infrastructure body as a centre of excellence

The Government knows what it wants to achieve, and it's critical that projects are delivered efficiently to provide value for money for New Zealanders.

models have been launched, like the re-purposing of Crown Fibre Holdings into Crown Infrastructure Partners in July last year to enable it to investigate and implement commercial models, including co-investment from the private sector or any other sector.

"The creation of the Provincial Growth Fund and the introduction of new petrol taxes are other examples."

He says traditional models are being challenged around the world, and need to be here.

"We are always interested in ideas that will make projects go better or faster, and it's encouraging that the Government and industry are discussing new models to pass cost on to the ultimate user."

#### 2. Define the economic benefits to support user-pays arguments

"There's a lot of 'who pays' talk, but it's not really clear how it will be applied, or how 'the user' or 'the beneficiary' is defined," says Fail.

"People understand that someone has to pay, but to take the example of light rail, what does 'user pays' or 'beneficiaries pay' actually mean? The benefits of light rail go further than transport and cover regeneration and unlocking economic benefits to the wider city.

In that context, the user or the beneficiary is much wider than people riding light rail and that conversation with the public needs to start early," says Sinclair.

"No one likes to be told they need to pay extra for something, so if they are going to pay they need to understand the benefit, and the counterfactual position – no user or beneficiary funding means no project," adds Fail.

#### 3. Develop and apply better procurement tools

An urgent job for the new agency would be reviewing existing procurement tools, to ensure they are fit-for-purpose and creating opportunities for unsolicited bids.

"Let's get best use of the tools we have and add to that suite of tools," says Sinclair.

"As an example, we need a detailed

and accepted framework to encourage unsolicited bids.

"There have been successful projects off the back of unsolicited bids overseas, but the framework for how they are assessed in New Zealand is not well developed, and is a barrier. We're missing out on potential opportunities to generate innovation and value.

"We can look at the range of tools that can be pulled under the PPP banner.

"Again Canada is a good example of where a broader range of funding and procurement models bring the private and public sectors together to efficiently deliver public sector infrastructure. We need options, as no one size fits all."

### Change brings great opportunity

"New Zealand is playing an urgent game of catch up, however we are not alone in grappling with big infrastructure issues such as strategy, funding, governance and delivery," says Fail.

"Lessons can be learnt from overseas and we're all aligned in wanting to ensure infrastructure needs are met. If a single body was formed, it would create a major opportunity for change. It can help shape the right future for New Zealand."

# Auckland ready to take the toll



We need smarter ways to get moving says **Patrick Brockie**

We applaud the \$28 billion, 10-year ATAP (Auckland Transport Alignment Programme) funding package for transport, of which \$16.7b is for new capital projects.

For the first time Auckland has a transport plan which is funded and supported by both central and local government.

It is also integrated with housing development without which we greatly exacerbate our congestion challenges.

A minister in charge of both assists in this approach.

There is real focus by this government and the New Zealand Transport Agency (NZTA) on rapid transit options for commuters travelling into the city and delivering on a government objective for urban regeneration.

We now await the detailed business cases for these projects.

Despite all that ATAP should deliver there remains a major issue for small, medium enterprises (SMEs) moving around Auckland in their day to day business.

SME's make up 96 per cent of all businesses in Auckland.

There is an expectation light rail and other projects will reduce traffic on the roads but it has not been the experience overseas with similar projects and it will be several years before these projects are completed.

Meanwhile Auckland continues to lose at least \$1.3b per annum in productivity (from the 2017 NZIER study co-sponsored by Infrastructure New Zealand) – an estimate on the

light side as it only accounts for weekdays, not weekends.

How do we enable tradespeople (i.e. builders, plumbers, electricians), couriers, truck drivers and concrete delivery vehicles to get from home to their place of work: from one side of the city to the other, from the North Shore to the south, over the bridge and back in a more timely manner?

Many face anywhere from two to three hours in traffic a day, starting their commute from 5.30am to 6am.

They told the authors of the NZIER study they were losing between 20-30 per cent of their productivity – having to hire more staff for the same volume of work or completing fewer jobs compared to just three years ago. Or they were working longer hours.

All this contributes to the higher costs we incur as consumers and customers whether in waiting for a tradesperson or the tradesperson's higher call-out fee and hourly rate.

We have to find smarter ways to get traffic moving.

The solution must include accelerating demand management through tolling.

Why are we hesitating when it is commonplace in developed countries and has been used effectively here for example Tauranga and the Northern Gateway?

From those I have spoken to (from chippies to office workers) the response is unequivocal – they are prepared to pay for a shorter commute.

Various polls by Infrastructure NZ

and the AA support this view.

Charging will change behaviour – those who need to be on the road will use it.

In other countries road pricing has created a "disappearing motorist" who doesn't need to travel at peak times.

Offshore evidence points to a 15-20 per cent reduction in congestion when road pricing is introduced.

Any revenues derived from tolling should be clearly dedicated to new infrastructure projects (second harbour crossing?)

This has a dramatic, immediate and positive impact on congestion.

Dynamic tolling (which can vary pricing based on traffic flows) allows even greater control over the outcomes our city needs.

I hear the question – is this about revenue collection?

It is not the primary driver but quite simply any revenues derived from tolling should be clearly dedicated to new infrastructure projects (second harbour crossing?) that can contribute to making Auckland the world's most livable city!

● Patrick Brockie is Chairman of Infrastructure New Zealand

# for NZ's infrastructure Inspiration across the Ditch



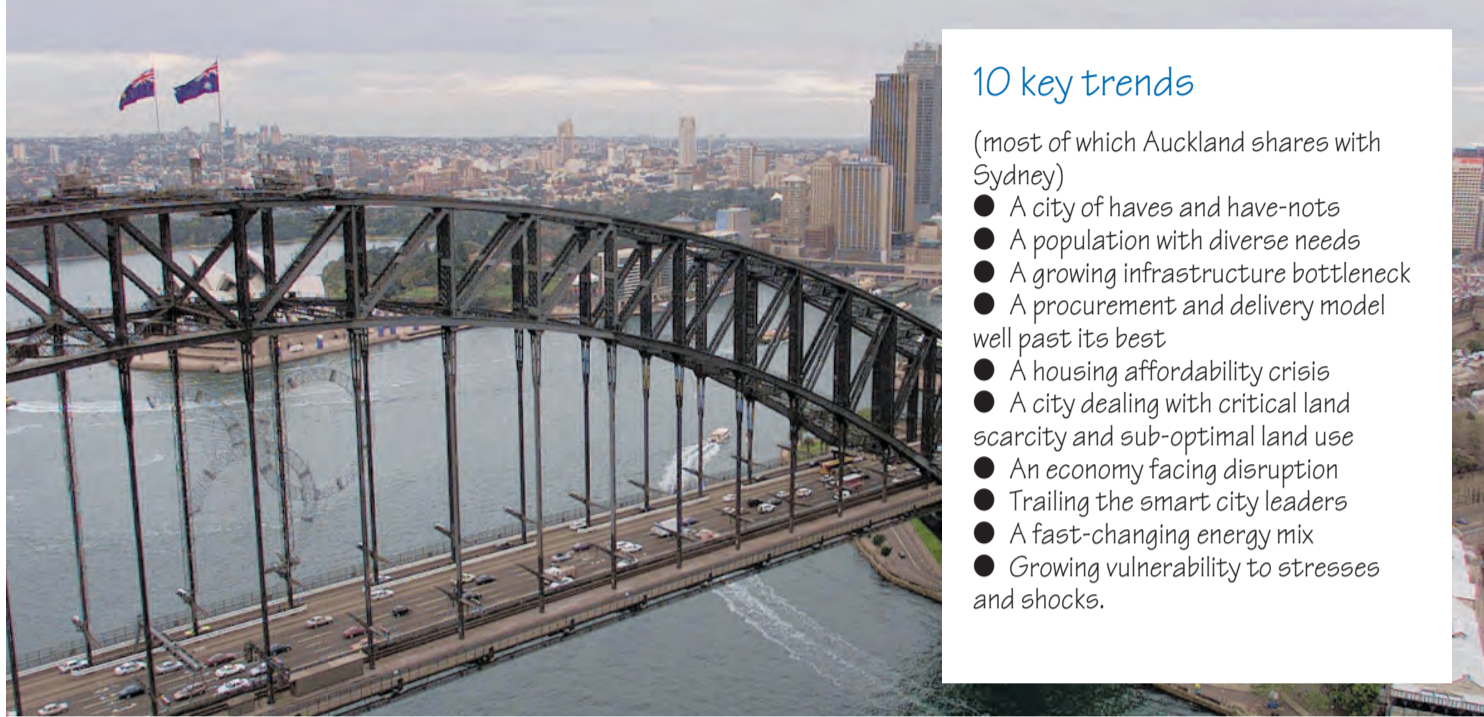
**Infrastructure**  
**James**  
**Rosenwax**

**T**he opportunities and lifestyle that attract people to Auckland are at risk if we don't address challenges created through the city's high rates of population growth – one of the highest in OECD countries.

Auckland's growth challenges parallel many of those facing our close neighbour, Sydney. Australia's economic powerhouse faces vast geographic imbalances in terms of jobs, amenities and services such as healthcare, education and public transport. It has a growing infrastructure backlog, as well as critical issues around land scarcity and housing affordability.

The recently released *Sydney Manifesto* is a provocative proposition to guide Sydney towards a future of 8 million people by 2050. It identifies key trends and provides a clear "to-do" list to tackle the liveability, affordability and productivity constraints that threaten the city.

Innovative solutions are urgently needed; 10 "big moves" are proposed in response to 10 key trends, each



**10 key trends**

(most of which Auckland shares with Sydney)

- A city of haves and have-nots
- A population with diverse needs
- A growing infrastructure bottleneck
- A procurement and delivery model well past its best
- A housing affordability crisis
- A city dealing with critical land scarcity and sub-optimal land use
- An economy facing disruption
- Trailing the smart city leaders
- A fast-changing energy mix
- Growing vulnerability to stresses and shocks.

supported by critical implementation actions.

The similarities between Sydney and Auckland are numerous. I'll consider two of the big trends in the context of Auckland.

Like Sydney, Auckland is facing a growing infrastructure bottleneck. While Auckland enjoys a thriving economy, the city lacks adequate infrastructure to realise its full potential and maintain its brilliant lustre. A successful city is a growing city, but among the side effects of success are congested roads, reduced public realm amenity

and a lack of options for journeys. Traffic congestion is a grave concern, leading to lost productivity and delays for commuters. Recent estimates put the cost of congestion in Auckland at \$2b a year.

Like Sydney, Auckland has a housing affordability crisis. As prices continue to jump, it is widely acknowledged the problem is complex. The dream of owning a home is ubiquitous; rethinking delivery and density will see more Aucklanders achieve their goal.

The first "big move" – to establish a new governance model – is common

to all trends identified in the Manifesto. Auckland's current hyper-growth requires new levels of governance to drive efficiency to make the most of scarce resources in shaping the city for future generations. This approach has infiltrated the private sector, where technology and new collaborative approaches are making work practices more competitive and forcing businesses to "do more with less". The same fundamentals can be applied to the city's leaders; those with the most power to shape the city's future. While Auckland's governance structure is

quite distinct from that of Sydney's, the principle of embedding true collaboration through technology and strong leadership, is the most important step in retaining Auckland as one of the most liveable cities on this planet.

The second big move relevant to Auckland is the delivery of "next generation" corridors. As we plan new areas of the city, we have the opportunity to combine plans for mass transit, housing and employment, essential infrastructure and open space to create truly connected communities that respond to needs of future generations. The Transport Agency's Supporting Growth Alliance project is long-term corridor planning at the city scale, aiming to support new housing and business areas in the region over the next 30 years.

The Sydney Manifesto is a detailed guide to support business and government with ambitious reform. It isn't just about more road and rail, it's about how we embrace technology to plan, govern and deliver the right projects in the most equitable way. Auckland has an opportunity to learn from Sydney as its successful future is designed, planned and delivered.

● James Rosenwax is Aecom's Cities Market Sector Director for Australia and New Zealand and author of the *Sydney Manifesto*. The full document can be found online at <https://www.aecom.com/au/brilliantcityinsights/sydney-manifesto/>



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# Proposals that hold water

Suggestions for reform could impact on local councils, reports **Tim McCready**

**F**igures released last month in a Ministry of Health report show one in five New Zealanders are drinking water from water supplies that don't meet current drinking water standards.

The report shows larger suppliers – including Auckland's Watercare, Wellington Water, and Dunedin – are meeting compliance standards throughout the year. But many smaller communities are failing to comply, including some of New Zealand's most iconic tourism destinations: Coromandel, Whangamata, Waitomo Caves, Tekapo and Milford Sound.

In the 2016 outbreak of gastroenteritis in Havelock North, an estimated 5500 of the town's 14,000 residents became ill with campylobacteriosis and 45 were hospitalised. It was ultimately traced to contamination of drinking water supplied by two bores – with sheep faeces being the likely source of the pathogen.

The Havelock North incident raised serious questions about the safety and security of New Zealand's drinking water, and sparked a Government Inquiry into the outbreak.

The inquiry made 51 recommendations to improve drinking water safety – including that all water supplies should be treated, and that a dedicated drinking water regulator should be established.

Speaking at the Local Government New Zealand annual conference last month, Minister for Local Government Nanaia Mahuta said:

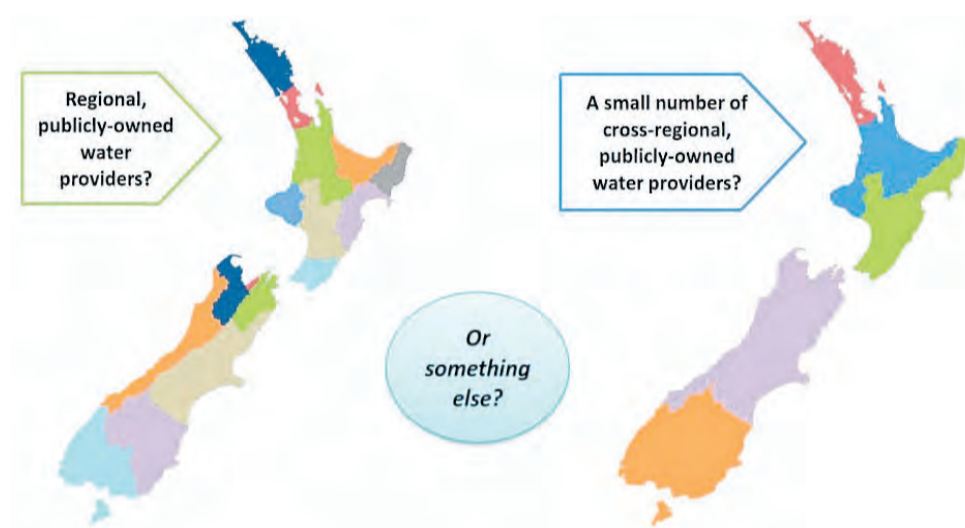
"The findings of the Havelock North Inquiry have been a sobering reminder of how, for the sake of our communities, we must make sure that drinking water services are high quality and safe. Too many areas across the country do not meet drinking water standards; in smaller areas, the level of compliance drops to less than 50 per cent."

## A shift to dedicated providers

Stage two of the Three Waters Review was launched in March, and is considering how to improve the management of drinking water, stormwater and wastewater.

New Zealand's three water infrastructure and services are primarily owned and delivered by the 67 territorial (district and city councils) and unitary authorities, or council-owned and controlled water organisations (in the case of Watercare and Wellington Water).

Accountability for overall service performance is through the local government election process. In theory, if the public is unhappy with the performance of their council they will elect new councillors. But in reality, most members of the public do not have the information, capability, or desire to effectively monitor service outcomes. In many cases – including Havelock North – it is not until things go wrong that the public find out the extent of the problem.



The Havelock North inquiry recommended moving to a system of aggregated, dedicated water providers. A Three Waters public discussion document released by Internal Affairs asks what the options for a new model might look like:

- Regional, publicly-owned water providers?
- A small number of cross-regional, publicly-owned providers?
- Something else?

Infrastructure New Zealand chief executive Stephen Selwood says scale really matters in the water business, because as well as enabling economies of scale, it provides the revenue base to maximise skills capability and capacity to govern, fund, oversee and operate water service delivery effectively.

"The value of scale and capability is already being clearly demonstrated by Watercare and Wellington Water who have between successfully

implemented significant improvements in services in their regions that were not previously possible under local council management," he says. "I favour a small number of providers, from one to five. One provider like Scottish Water with independent regulation has proven very successful. With one provider you would look to benchmark performance with international comparators like the Australian states. Between three and five providers provides the opportunity to benchmark across NZ companies as well."

Mahuta, who recently returned from a research trip to Scotland and Ireland to consider the models used there, says there are no predetermined solutions, but a bottom line is continued public ownership of existing three waters infrastructure.

"Any option must ensure continued public ownership of existing infrastructure assets and we must

Nanaia Mahuta

provide the protections of that assurance through governance and ownership arrangements, at law and ministerial oversight," she says.

Mahuta says it is critical the Government works closely with councils, iwi, and stakeholders with an interest in three waters services to develop options and recommendations.

How the overhaul will be paid for remains unclear, and Mahuta has acknowledged funding challenges: "Climate and population change alone mean that, even if we address the challenges in front of us now, significant funding pressures will continue to arise for decades to come."

Selwood says it should pay for itself, citing Scottish Water as an example:

"This publicly-owned national water service provider delivers drinking and wastewater services to five million people across an urban and rural hinterland comparable to

## Sector deficiencies

Successive reports over the past two decades undertaken by a diverse range of agencies and organisations (including the Office of the Auditor General, Water New Zealand, Engineering New Zealand, Infrastructure New Zealand, the Parliamentary Commissioner for the Environment and the Local Government Infrastructure Efficiency Expert Advisory Group) have pointed to serious deficiencies across the sector. Between them, these expert bodies have compiled a compelling case for change. Major challenges include:

- lack of information about the state of infrastructure assets – especially in small rural councils
- lack of information or control of the cost of providing water infrastructure and services
- excessive and inefficient water use
- contamination of surface water and groundwater from uncontrolled or poorly managed storm water drainage and wastewater disposal – one in five wastewater treatment plants are operating on expired discharge consents
- poor recreational and bathing water quality
- lack of investment and deferred maintenance, in part through incomplete pricing or small ratepayer base, and political constraints to increases in local authority rates and charges
- institutional and regulatory barriers to improved management
- regular water supply shortages – especially during summer
- high frequency of "boil water" notices
- a backlog of investment in water infrastructure of up to \$7 billion
- infrastructure failure

NZ. Since formation in 2002, Scottish Water has delivered substantial improvement in water quality, environmental performance and customer satisfaction, while reducing operating costs by 40 per cent and capital costs by 20 per cent on an enlarged capital investment programme."

One of the main challenges with reform of the water sector will be the impact on local councils. For smaller councils, water is a significant component of their responsibilities. Removing these raises questions about future viability.

Says Selwood: "I think this provides an opportunity to refocus councils from managing utilities and engineering challenges to being more focused on their communities, their people and giving true meaning to local engagement and participation by people in local affairs."

## Water treatment plant takes contractors' top award

A major upgrade to Auckland's main water treatment plant in Mangere (pictured) took top honours at the Civil Contractors New Zealand's (CCNZ) national awards.

The winner of the coveted CCNZ Hirepool Construction Excellence Awards "Projects with a value greater than \$100 million" category was the \$140m Mangere Wastewater Treatment Plant Biological Nutrient Removal Upgrade – a McConnell Dowell and HEB Construction joint venture.

The project, completed in April 2018, adds water treatment capacity for around 250,000 people. Contractors moved 100,000m<sup>3</sup> of

earth, poured 15,000m<sup>3</sup> of concrete, and installed 10km of pipework and 90km of cable to get the job done. It faced off against Christchurch's Russley Road SH1 upgrade, a joint venture between McConnell Dowell and Downer.

CCNZ Chief Executive Peter Silcock said though the awards represented pinnacle industry achievements, it was also important to recognise the everyday achievements of New Zealand's contracting workforce.

A Downer NZ and HEB Construction joint venture to install a new wharf at Waitangi in the Chatham Islands which required a purpose-



built quarry won the \$20m-\$100m category, while HEB Construction won the \$5m-\$20m category for

repairs to Wellington's damaged wharf after the Kaikoura earthquake. Schick Civil Construction was

awarded the up to \$5m – larger companies category for Hamilton's Victoria on the River development on the banks of the Waikato, with March Construction highly commended in the category for a challenging project replacing the Kaipoi sewer outlet.

ARC Projects won the up to \$5m – smaller companies category for creation of a drain and pump station that worked in harmony with its surrounding environment in a Christchurch wetland, while Taylor Contracting won the Maintenance and management of assets category for its work in maintaining 285km of Tasman District riverbank.

# Towards an autonomous future

continued from D24

**Edwards:** People forget there are already many autonomous vehicles at work in airports, warehouses, ports and mining to name a few and these are playing a significant part in reducing health and safety risk. These are largely in confined areas rather than on the open road so the infrastructure is planned for this. It becomes exponentially more difficult on the open road system because the increase in variables is so dramatic.

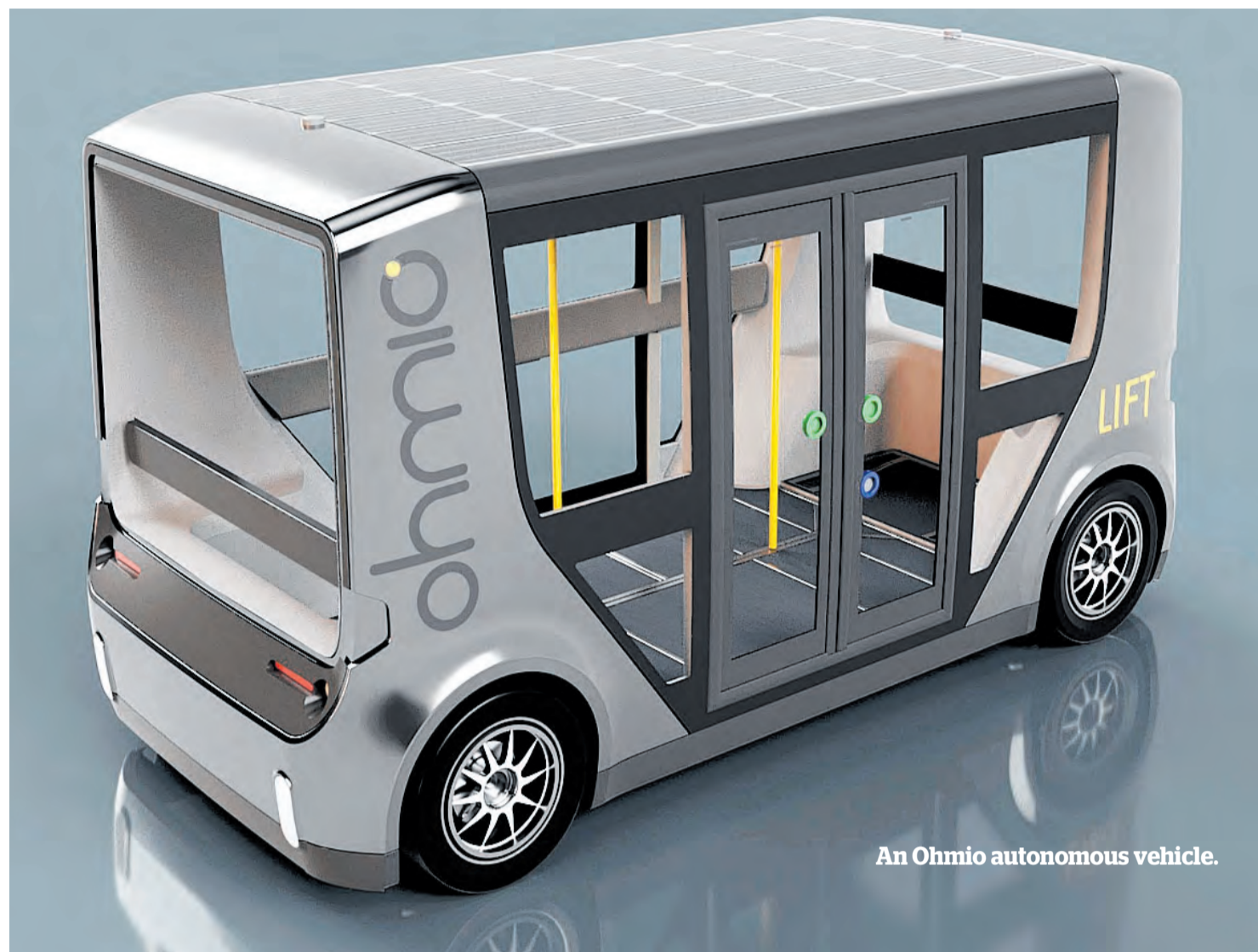
**Duggan:** The consistency and quality of road markings and signage (or lack of) presents a very real challenge for today's semi-autonomous vehicles, of which there are an increasing number of models on our roads. GPS accuracy and the next generation of wireless connectivity (5G) will also become increasingly critical considerations. In simple terms, AI is about the collection, processing and evaluation of data from multiple sources to ensure the highest quality of decision-making... autonomous vehicles will be fitted with more sensors than ever before, and infrastructure has a vital role to play in terms of data accuracy and processing speeds. Developments in autonomy and electrification have traditionally taken place in parallel, but their paths have now converged to the extent it's now widely accepted there won't be a fully autonomous vehicle that isn't also electric, so charging infrastructure will have a key role to play by default.

**What opportunities would the introduction of autonomous vehicles bring to New Zealand? How could their introduction influence future infrastructure?**

**Hikmet:** The introduction of autonomous vehicles (not just autonomous cars) will allow many people to regain a sense of freedom and independence that they may have lost or never had. Autonomous vehicles also mean you won't need to invest in close parking, you can instead turn that space into something more productive. I'm certain that the first urban generation who won't need a driver's licence has already been born in New Zealand.

**Ensor:** Autonomous vehicles give greater travel opportunities for people who currently rely on others to drive them or who use public transport. Demand for infrastructure may increase if this makes it easier to travel in a car by yourself.

**Reid:** The AI Forum's recent report *Artificial Intelligence - Shaping a Future New Zealand* identifies a long list of AI applications which could benefit New Zealand across many sectors: agriculture, finance, tourism as well as the growing tech export sector. In the context of infrastructure, here are just a few ideas:



An Ohmio autonomous vehicle.

- **Health & Safety:** using cameras, automated sensors to anticipate dangerous situations and respond. Also, automated robotics have the potential to do all the dirty, dangerous jobs involved in infrastructure – while being intelligently aware of maintaining human safety around them.

- **Process automation:** throughout the whole process of contracts, design, earthmoving, construction, cable laying. Wherever there is a large amount of data, machine learning enables businesses to identify patterns, make better predictions and optimise processes.

- **Simplifying contracts:** currently natural language AI is being used to better understand complex legal contracts and identify key clauses to focus on. Given the sums of money involved in infrastructure projects, this is a key tool for both parties to a contract to help ensure that hidden risks are reduced.

- **Monitoring project progress:** using cameras and machine vision to automatically measure project progress. Christchurch GeoAI company Orbica are doing amazing work in this space using satellite imagery to identify how far building construction has progressed. Personally, I reckon there's an opportunity for autonomous "swarm bots" in the infrastructure sector – for example a swarm of little earth moving robots controlled by a "hive mind" could deliver all sorts of potential improvements for output,

speed, precision, energy efficiency and safety. You heard it here first.

**Duggan:** Courtesy of features such as intelligent cruise control, steering support with 'lane keeping' technology and Autonomous Emergency Braking, the 'semi-autonomous' vehicles on our roads today have already begun to have a positive impact by reducing the frequency and severity of accidents. It's no coincidence that autonomous vehicles have become increasingly topical at a time when in major cities around the world populations are outgrowing infrastructure, air quality is deteriorating, traffic accidents have become a global health issue and commute times continue to increase. Whether in London, Shanghai, Sydney or Auckland, fully autonomous vehicles are geared towards improving the productivity, sustainability, efficiency and safety of our daily commute.

Downstream, there's no question that the advent of fully autonomous vehicles will influence social behaviour in relation to mobility, which will in turn influence the layout of our cities.

**Is there an opportunity for New Zealand to propel itself to the forefront in this area?**

**Hikmet:** New Zealand, particularly Christchurch, is pretty close to the forefront here. Christchurch International Airport's autonomous vehicle trial is just about to wrap up, and they have ordered the first

Ohmio LIFT which will be deployed there – making it one of the first airport autonomous vehicle deployments in the world. I know that some of the largest airports in the world are keenly observing and asking Christchurch Airport about their experience with autonomous vehicles. NZTA are also working with Christchurch City Council to operate parts of the Red Zone into an autonomous vehicle testing ground.

**Ensor:** With the amount of money being invested in research by major global companies, New Zealand needs to look our skills in "making things happen". We could focus on removing specific technological barriers that vehicles will face driving in countries like New Zealand.

**Edwards:** I am concerned that the wheels of decision making turn too slowly here. NZ has some great minds working on AI development, robotics and so on, but in the technology world, you need an entrepreneurial mindset where you are allowed to experiment and sometimes fail in the interests of learning. In this country we tend to debate policy and regulation over months and sometimes years, by which time key opportunities can be lost. When it comes to infrastructure, our low tax base means that financial commitments to major infrastructure projects will be scrutinised and held up by competing priorities. New Zealanders (and the media) can be very intolerant of false starts and prototype failures, which is not

conductive to experimentation and will hold this country back, particularly in the infrastructure space.

**Reid:** As a country our non-tech sector businesses need to think ahead more beyond next quarter's profit numbers and start investing in long term data and technology-driven innovation. Our productivity remains pretty static and there are increasing signs that we are falling behind other OECD countries in terms of our economic competitiveness. While technology is not the only factor we will only reap the rewards of these new technologies if we invest in R&D and develop a deeper innovation capability throughout our business culture. Otherwise we will just be downstream consumers and price-takers from overseas tech firms.

**Duggan:** While New Zealand's legal framework is relatively "autonomous vehicle friendly" and Kiwis are known for being early adopters of technology, the size of our market, our remote location relative to vehicle development and manufacturing facilities, our topography and low population density, and our current infrastructure are all barriers which will prevent New Zealand positioning itself at the forefront of autonomous vehicle testing and implementation. It's critically important that we keep up in terms of investment in infrastructure – which will have far broader benefits than for autonomous vehicles alone – and there's no question that the vehicle technology available to us is advancing at a greater rate than ever before, but I'm not convinced there's a need for New Zealand to adopt a leadership position in this regard.

**What other areas of artificial intelligence do you think will influence New Zealand's infrastructure development?**

**Ensor:** We need to look at how artificial intelligence can speed up the way we design, consent and construct infrastructure projects. Embedding artificial intelligence into these processes could shorten the time required to deliver large infrastructure projects by months or even years.

**Hikmet:** Machine learning and computer vision will help with analytics: counting pedestrians or telling you how busy a road is, how many vehicles are on it, and how fast they're going. You can then use that generated data for analytics and predictive modelling. If urban planners and transport operators are more aware of what impact different decisions (be it infrastructure or policy) will have, they will make better choices to bring about the change that's really needed for their specific communities.

## WITH THANKS TO OUR PARTNERS

“ You cannot separate the buildings out from the infrastructure of cities and the mobility of transit ”

Norman Foster

# From A to B, autonomously



**Infrastructure**  
**Tim McCready**

**How prepared is NZ for artificial intelligence on its roads and other infrastructure?**

**Hikmet:** Prepared? It's already out there and has been for decades! Adaptive braking, parallel parking assistance, lane-keeping systems, driver fatigue sensors, adaptive traffic control systems. There is so much artificial intelligence already around you and not just on the roads.

**Ensor:** It is hard to prepare when there is so much uncertainty around what changes artificial intelligence will create. We need to wait before making bets on which emerging technologies will dominate.

**Duggan:** KPMG's 2018 Autonomous Vehicles Readiness Index (AVRI) made some interesting headway in this regard, examining a cross-section of 20 countries in terms of their progress and capacity for adopting autonomous vehicle technology – New Zealand was deemed to be in the middle of the pack, in ninth place. The Index evaluated each country according to four pillars integral to a country's capacity to adopt and integrate autonomous vehicles: Policy & Legislation, Technology & Innovation, Infrastructure and Consumer Acceptance. Advances in vehicle intelligence are happening at a far greater rate than advances in infrastructure; this is where our biggest current challenges lie.

The Herald spoke to industry leaders to understand the AI opportunities for New Zealand, and what it could mean for the future of our roads and infrastructure.



**Mahmood Hikmet,**  
**R&D Co-ordinator, Ohmio**



**Matthew Ensor, Business**  
**Director- Advisory, Beca**



**Coby Duggan, GM, Volvo**  
**New Zealand**



**Diane Edwards, GM People,**  
**Systems and Technology,**  
**Ports of Auckland**



**Ben Reid, Executive**  
**Director, AI Forum NZ**

**There have been some recent scares involving autonomous vehicles - notably the Uber accident in Arizona that killed a pedestrian. Will momentum slow because of these concerns?**

**Hikmet:** Autonomous vehicle developers and government need to work together to ensure that what's happening is safe. If we see more of these deaths, public opinion can turn against autonomous vehicles - which would be a real shame. That isn't to say autonomous vehicles are completely safe, but our current roads are far from it and we should be doing everything we can to reduce deaths. Autonomous vehicles are one way this number can be reduced.

**Ensor:** That was a tragic example of how today's autonomous vehicles

need to keep learning. It's important that the hype around autonomous vehicles loses some momentum and we understand better what their capabilities will be and their limitations.

**Edwards:** The accidents involving autonomous vehicles have dampened enthusiasm among the public but people seem to have forgotten that many accidents occur when there is a human at the wheel. Throughout history there are examples where new technologies have ended in tragic circumstances – like the Hindenburg airship and the Space Shuttle Challenger explosion. These incidents temporarily set back developments in their field, but long term, the lessons learned enabled the technologies to become safer and

obstacles were overcome.

**Reid:** We still think of autonomous vehicles as something novel and new – however in the US, Alphabet-owned Waymo recently announced their test fleet has driven seven million miles. As with all exponential technologies people will be surprised at how quickly autonomous vehicles become part of our daily lives – and will quickly be demonstrated being as safe as a human driver – then very quickly far exceed the safety performance of human drivers.

**What challenges does New Zealand's roading (and other) infrastructure bring for the introduction of autonomous vehicles?**

**Hikmet:** Many of the autonomous

vehicles being built for the road are being trained and designed for driving on the right-hand side – it's not a completely trivial task to convert them and will require intentional effort from developers to change them over. We also haven't decided on a communication range for vehicular communication – we can either go with the Europe/US standard or the Japanese one.

**Ensor:** I hope the major manufacturers will train their autonomous vehicles to drive on the left. The most important thing is to make changes to help autonomous vehicles avoid making mistakes in challenging areas, particularly around roadworks and schools.

**continued on D23**

## AUCKLAND LIGHT RAIL

*Transforming the way people live and move*

Light rail is part of a wider rapid transit network for Auckland that will provide a world class public transport system to make it easier and more reliable for people to get where they want to be.

It's a proven solution that meets our future needs and unlocks critical growth opportunities to help create vibrant, liveable communities with better access to jobs, health services, education and recreation.

Running on a dedicated corridor, it will be separated from general traffic meaning more reliable journey times.

Two corridors will be delivered in the next ten years - City Centre to Māngere and City Centre to Northwest. Together these will connect communities, help alleviate bus congestion in the city centre, support and unlock significant growth potential, and provide better access to growing employment areas including the city centre and the Auckland International Airport.



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