



10 December 20024

Infrastructure Commission/Te Waihanga
By email: info@tewaihanga.govt.nz

Tēnā koutou

RE: TESTING OUR THINKING: DEVELOPING AN ENDURING NATIONAL INFRASTRUCTURE PLAN

Thank you for the opportunity to submit on the New Zealand Infrastructure Commission's Discussion Document 'Developing an enduring National Infrastructure Plan'.

This submission reflects the views of Engineering New Zealand and members of our technical groups who participated in your workshops.

Engineering New Zealand welcomes the development of a National Infrastructure Plan and appreciates the work the Commission is doing to support its development. We agree with many of the challenges you pose in the document. Our submission focuses on ideas to supplement the direction you are taking. Attached to this letter is our response to your questions.

Key Points

The key points we wish to emphasise regarding the Plan are the need for:

1. **A structured robust infrastructure pipeline process** – to enable bi-partisan support. Ideally the Plan goes as far as possible to give the current and future Governments a robust affordable 'train track' to follow and clear criteria to help assess ideas outside that.
2. **Cost benefit emphasis** – to ensure a thorough cost benefit evaluation is used by all – only on initiatives we can afford and are achievable.
3. **Smarter procurement and project processes** – where many potential gains can be made, including:
 - traction on improving productivity
 - use of standardised design for repeatable projects
 - Government being a smarter, more informed client
 - lessons learnt
 - Government agencies having principal Engineer advisors.
4. **Cultural and behavioural change (Government and public)** – leadership, accountability, and transparency from Ministers and Government agencies is needed to drive the change, and give certainty– along with:
 - bringing the public on the journey by having clear, evidence-based information on what we can afford, and why

- appropriately maintaining existing assets, where economic to do so, before building new and using pricing signals first to manage demand and determine when new is needed.

5. Key interdependencies are integrated, such as.

- the infrastructure National Policy Statement – how will this vision used? (MfE)
- the reform of the building consent structure –to rationalise the numbers of BCAs and improve consistency (MBIE)
- the review of the standards funding and delivery process – the current process is creating infrastructure risks and inefficiencies (MBIE).

Conclusion

Engineering New Zealand recommends you undertake a phased approach that sequences and prioritises short term work on the path to long term change. There are many things in our submission that can be done now, which align with the direction of your work and cannot wait. If construction work does not get to market quicker in the short term, we won't have sufficient engineering and construction talent left in New Zealand to achieve our aims, without extra cost and time.

Engineering New Zealand appreciates the opportunity to provide feedback and looks forward to engaging in the next phase when a draft National Infrastructure Plan is available for comment.

If we can be of any assistance or provide further information, please do not hesitate to contact us.

Nāku, nā



Dr Richard Templer
Chief Executive

November 22, 2024

Engineering New Zealand's submission, as follows:

Section one: Why we need a National Infrastructure Plan

1. What are the **most critical infrastructure challenges** that the National Infrastructure Plan (the Plan) needs to address over the next 30 years?

*In the **long-term** – having an evidenced based Plan that provides sufficient guidance so **political consensus** can be achieved and maintained, aligned with an agreed **cross-party vision for infrastructure**.*

*This Plans needs to show the **systemic - institutional/regulatory/behavioural changes** that should be made – when and how to achieve the vision. Alongside this, the Plan should have a **prioritised list of opportunities** assessed against criteria as best meeting the vision, detailing what work is needed – in what sector, when, where and how – with choices, trade-offs and project recommendations. This list needs to be within what we can afford. Projects should include all the tools, including demand management.*

In our view, the critical challenges to be worked through in the Plan are to (in no particular order):

- a) Analyse New Zealand's **low productivity** (building on the work of the Productivity Commission) and have recommendations to address it. We consider greater **use of standardised design for repeatable projects** to be a key step to improving our productivity.
 - 1.
- b) Make some **explicit assumptions** on matters of uncertainty discussed in your paper and review them regularly. We will always have areas of uncertainty– but based on New Zealand and overseas research we can make reasonable assumptions – to maintain progress. Review points give the flexibility to change – at the appropriate time, such as before significant funding is committed.
 - 2.
- c) Plan according to **affordability** – not want. New Zealand cannot afford the infrastructure it wants because of various population, economic, political and geographical considerations – and this needs to be stressed more.
 - 3.
- d) Change **public behaviours and expectations-** bring people on the journey of why we cannot afford the same as other countries and why we must manage within our means. Coupled with the use of better **pricing signals**. Sequencing some pricing tools first might negate the need for new investment.
 - 4.
- e) Prioritise **maintaining current assets where it is economic to do so**, providing regulations and guidance for asset managers on this. Ensuring Government organisations have access to skills and knowledge to effectively do asset management – and are required to prioritise and report on this.
 - 5.
- f) **Enhance interdependency management – to maximise and leverage**. There are many interdependencies with Government reforms – one of the critical challenges is clarifying how all the reforms fit together in a systemic way, are sequenced and can be maximised. For instance, how is the proposed **Infrastructure National Policy Statement** going to fit into the vision (or assume

that role) going forward? Plus, **MBIE's building systems reforms** to streamline our building and construction landscape.

6.
 - g) Improve **Standards New Zealand funding and delivery model**. New Zealand is suffering from a lack of investment in and inefficiencies within the standards system, with outdated (or non-existent) standards creating risk for design and manufacture. This will create significant safety and inefficiencies in our infrastructure if it is not addressed soon. It is another interdependency.
7.
 - h) **Learn from what works** – here and internationally. E.g. Transit New Zealand's project evaluation system was, when it started, a successful example of a bi-partisan approach to transport infrastructure. Projects were selected based on their cost benefit and spend remained within the dedicated funds from road user charges, petrol exercise duty, licensing etc.
8.
 - i) **Require best practice project disciplines – such as scope management, governance, and collaboration**. Evidence shows improvements in government infrastructure planning and management are sorely needed. We are too small a country to repeatedly dig up new road seals to undertake planned pipe fixes etc. The right skills, planning, information sharing, culture of openly discussing lessons learnt and post project reviews will go a long way to addressing this.
9.
 - j) **Bring a multi-dimensional infrastructure view**- both segmenting infrastructure and then through a systems lens- i.e. looking at the different types of infrastructure – vertical, horizontal – as well as sector, community and locational needs, interdependencies and variations – through time- to get the best package.

In the **short term** – the Government needs to use, and then reinforce through this Plan, its levers to rapidly advance infrastructure work, including.

- **Requiring the use of standard contracts without special conditions**
- **Increased direction from Government:** A long-term infrastructure vision and funding horizon, as well as empowering Government agencies to make infrastructure decisions, get work to market quicker and use longer contracts to give greater certainty to industry.
- **Government agencies being a more informed and smarter client**
 - To help with this we encourage government agencies to hire technical expertise at senior levels, such as principal engineer roles. Employing engineers in senior positions will help agencies with informed decision-making and support institutional knowledge within government.

This can be reinforced in the short term via the Government using existing accountability tools to require these changes, such as public **Letters of Expectations** and further monitoring of expenditure and performance.

We also suggest the Government **add infrastructure targets to the Quarter 1 and future Action Plans**, particularly around the number of Government projects that make it to market in certain sectors. Transparency and certainty are needed.

These short-term ideas are detailed more under question 6 "better Government decision making".

2. How can te ao Māori perspectives and principles be used to strengthen the National Infrastructure Plan's approach to long-term infrastructure planning?

- *The Māori world view supports and integrates well with many of the points raised in the discussion document. Greater use of interconnected thinking is needed to bring together the wider system views – people, economics, and the environment into decision-making.*
- *Long-term sustainability and kaitiakitanga – aligns well and supports the principles in the discussion document of using renewable resources, reducing waste, and being more sustainable.*
- *Inclusive decision-making is fundamental to successful infrastructure planning and ensuring input from all affected parties.*
- *Considering future generations is key to success and is acknowledged in your discussion document.*

10.

Section two: Long-term expectations

3. What are the main sources of uncertainty in infrastructure planning, and how could they be addressed when considering new capital investments?

This has been covered in our answer to question 1.

Re: the eight drivers of infrastructure spend you mention, where there is little information on past trends to guide the future – it would be reasonable to make assumptions based on any evidence that can be found – which are reassessed at appropriate intervals.

Section three: Existing investment intentions

4. How can the National Infrastructure Pipeline be used to better support infrastructure planning and delivery across New Zealand?

Integrated assessment of the two project channels

We are keen to understand more about how the two proposed siloed channels of projects under this Plan are going to work. The Pipeline (with funded and in delivery projects) and then the IPP process (with unfunded/vetted proposals that might be funded). Ideally, these two channels go through one assessment process/against consistent principles – to work out the best sequence of projects against need/vision – and become a prioritised National Plan. We understand potentially over time these channels could coalesce as current projects are complete, and new ones are chosen from the IPP.

Stricter use of cost benefit analysis

A stricter use of cost benefit is recommended. We question whether all Roads of National Significance should be prioritised ahead of other projects when some have a very low-cost benefit ratio and are taking up a significant proportion of limited funding.

Clear project list that's affordable

We recommend you go further than 'shining a light' on the gaps between what is planned and what is needed. We suggest you make clear recommendations on what and how change is needed by whom.

Similarly, we need to stop planning infrastructure that cannot be funded. Developing business cases for options that cannot realistically be funded is not an effective use of resources.

We recommend that the National Plan has a prioritised project list, based on all your evidence and analysis - listing what sector maintenance is needed, where/when and what sector needs new investment, where, when and why. We agree with the idea of viewing communities' problems/opportunities in an

interconnected way because of the interrelationships and these being prioritised before choosing projects. In considering our full range of tools and their sequence means the early use of demand management might mean new infrastructure is not needed, or a different option might better suit.

The project list should be supported by a set of actions on what system and regulatory changes are needed to support and enable this.

Section four: Changing the approach

5. Are we focusing on the right problems, and are there others we should consider?
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As referenced in question 1, some other problems to also consider are:

- Standards funding and development
- Managing public expectations and behaviours
- Better project disciplines
- Learning from Transit's previous cost/benefit approach
- Integrate more with other Government reforms, such as reforms to BCAs.

Theme one: Capability to plan and build

Investment management: Stability, consistency and future focus

6. What changes would enable better infrastructure investment decisions by central and local government?
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Systemic opportunities

There are benefits to the Government considering the following initiatives:

- *Increased direction from Government: A long-term infrastructure vision and funding horizon, as well as empowering Government Agencies to make infrastructure decisions, get work to market quicker and use longer contracts to give greater certainty to industry. There are also options for procurement guidance and a library of exemplar contracts.*
- *Government agencies being a more informed and smarter client, including:*
 - *bringing in technical experts early and at the decision-making table [Government infrastructure procurers/managers need principal Engineer advisors]*
 - *better quality scoping of projects, including more realistic upfront project estimates and assumptions*
 - *a disciplined approach in project planning and execution rather than an ad hoc or reactive approach*
 - *more appropriate assessment/sharing of risk*
 - *reliable and knowledgeable procurement and project teams, which undertake due diligence*
 - *pre-approval and bundling to create an even flow of work*
 - *training on and assistance in asset management and a requirement to understand the current stock and undertake asset management plans*
 - *training and assistance in cost benefit analysis*
 - *better communicating the benefits and costs to the public – and bring them on the journey*

- *better coordination with others – to help with sequencing of decisions and flow on effects*
- *a culture of open and transparent reviews, risk assessment, lessons learnt and evaluation – which promotes a no blame - early assessment of problems and variations.*

Accountability tools

Using existing accountability tools to assist Crown entities and Departments address improvement opportunities, such as Letters of Expectations to Departments (including the new Infrastructure Agency), Crown Entity Statement of Performance Expectations and further monitoring of expenditure and performance.

7. How should we think about balancing competing investment needs when there is not enough money to build everything?

Many of the points we raise under question 1 are relevant here, but in summary:

- *clear infrastructure vision – to guide*
- *more and better use of cost benefit analysis*
- *coordination between agencies and a more systems integrated view*
- *work out what we can afford – and start from this – with clear guidance to ensure resources are not spent planning what we can't afford*
- *increase capacity in business case development*
- *have an asset management strategy – maintain where cost effective to do so.*
- *better use of project disciplines such as interdependency management, use of assumptions and risk/issue management, clear review points and a culture of options analysis when significant changes such as the price of projects are found. Stopping or downscaling projects should be an option sometimes.*
- *post implementation reviews undertaken and shared*
- *greater use of pricing signals – to help manage demand. Also considering the sequencing of these tools. Reduced traffic on the road via congestion charging may mean some new investments are not needed or a different option is better*
- *greater understanding of maintaining current infrastructure assets*
- *consider societal changes. e.g. intergenerational housing needs or more liveable cities.*

Workforce and project leadership: Building capability is essential

8. How can we improve leadership in public infrastructure projects to make sure they're well planned and delivered? What's stopping us from doing this?

Accountability and transparency improvements

In our view - accountability and transparency improvements in Government agencies are key. This includes:

- *explicit direction from Ministers on expectations*
- *a bi-partisan approach to infrastructure*
- *a long and enduring vision to value infrastructure as a long-term asset rather than sweating them with minimising efforts for ongoing maintenance*
- *leadership from CEs in the importance of project disciplines and risk management*
- *culture changes within some Government agencies – in terms of understanding and prioritising good asset management and project disciplines*
- *greater capability development and better recruitment practices – to get the right project leadership skills*

- use of external experts – early in the process, including Government agencies using principal Engineer advisors
- more monitoring, reporting, and sharing of results – and a culture that allows open and honest results to be shared, discussed and acted on
- prioritising good governance.

As discussed further below – a review of the local government infrastructure structure is also key, particularly the number of BCAs/Councils involved in infrastructure.

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9. How can we build a more **capable and diverse infrastructure workforce** that draws on all of New Zealand's talent?
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To make a capable and diverse infrastructure workforce we need to ensure we have enough of the skills and talent we need to deliver. Engineering New Zealand represents engineers, a critical profession for delivering infrastructure, and we have long been concerned about the future pipeline of engineers. Below is some information on the scale of our concern and actions needed.

Engineering skills background

- *Despite the recent downturn in infrastructure work, we have a long-term engineering skills shortage and the halt to major projects (and resulting loss of engineers) is compounding this.*
- *PWC estimated in 2021 that New Zealand needed between 1,500 and **2,300 additional engineers** each year to meet industry demands and support ongoing economic growth. Historically these additional engineers come through the education system, as well as immigration.*
- *This problem is growing. We have an aging workforce, a large and growing infrastructure deficient, and a growing population. Plus, the current downturn in Government work means engineers are being lost due to firms having to restructure to stay afloat, leaving to opportunities overseas and graduates are not being recruited.*
- *We have a diversity shortfall which does not reflect our societal makeup – only approximately 8.9% of the engineering workforce is female, 9% Māori and 4% Pacific Peoples.*
- *This problem is wider than engineering, with the construction sector and many other industries facing similar workforce challenges.*

Actions

- *There are many challenges throughout the education and workforce pathway for future engineers, including poor uptake and performance of New Zealand students in science, technology, engineering and math's subjects.*
- *Many in the industry, including Engineering New Zealand, have an increasing programme of work to address the skills shortage. We are about to release an action plan to raise awareness of the challenges and the work underway by ourselves, ACE and Waihanga Ara Rau, to address the long-term engineering workforce challenges.*

11.

However, this is a systemic issue where wide levers are needed. In terms of potential Government actions:

- *There is a need for more funding and better pricing signals in tertiary education to help incentivise universities to prioritise the training of engineers as well as recognition of the cost of engineering courses and increased need when funding universities.*
- *Continued focus on improvements to the STEM curriculum and support for teachers.*
- *Improving the Government's infrastructure-related capability as discussed earlier in this submission.*

- *Should we consider technical improvements, such as AI, to help us with decision-making?*
- *Are we going to talk about the importance of continued R&D funding for operational research to increase sector knowledge? e.g. sustainable products or intergenerational timber design*

Retention of talent and capability

- *Stop boom bust cycles. If New Zealand wishes to retain talent and capability in the infrastructure space, there must be continuity in significant projects. The recent abrupt stop in most infrastructure projects from central and local government has resulted in a significant loss of talent from government, contractors and constructors. It will in the future be hard to get sufficient unique expertise in a timely and cost-effective way to coincide with project deadlines.*

12.

Project costs: Escalation means less infrastructure services

10. What approaches could be used to get better value from our infrastructure dollar? What's stopping us from doing this?

In our view, we need:

Improved procurement

- *we should be requiring the use of standard contracts for both design and building and civil engineering construction (NZS 3910:2023) - without special conditions. Variations are often not needed and have a huge impact on cost and time.*
- *better scope management to prevent scope creep or scope variations – which impacts on costs considerably*

Consistency

- *greater use of standardised design for repeatable projects. There are many examples – such as schools, water treatment – where there is no need for variation which causes additional costs.*
- *greater consistency in building consenting (this Plan needs to tie in with the Government's proposed reforms of the building consent system) There are 67 BCAs undertaking these functions in New Zealand. Having many BCAs with differing interpretations of compliance with the Building Code risks inconsistent decisions, increased costs, and different outcomes across the country.*

Address low productivity

- *a better understanding of and way forward to address New Zealand's low productivity (building on the work of the Productivity Commission)*
 - *(i.e. how much is it lack of scale, need for better coordination between agencies, distance to markets, slow uptake of technology, lack of organisational empowerment to make decisions, skill shortage, risk aversion, environmental/geographical, political interference, poor procurement or lack of good exemplars etc) and*
 - *what is the best package and timing of options to address low productivity to support the Plan.*
 - *consideration of product life-cycle costs rather than lowest capex, e.g. LED light bulbs.*

Leadership

- *better decision-making - as discussed in question 6.*
- *improved cross government commitment, leadership and accountability as discussed in question 8.*
- *no more breaking of crown contracts, without good reason. This can result in cost increases due to the increased risk of doing business with New Zealand.*

Theme 2: Taking care of what we've got

Asset management: Managing what we already have is the biggest task

11. What strategies would encourage a better long-term view of asset management and how could asset management planning be improved? What's stopping us from doing this?

We support your comments that:

- *there is a need for improved asset management – and increased capability and use in Government.*
- *renewal should not automatically be on a 'like for like' or better standard. Maintenance should only be according to what is economic, considering what has changed*
- *we need to understand and plan for different needs/strategies in different sectors*
- *it's important to understand the impact of delay on maintenance cost and failure risk.*

Funding and regulatory support for asset management

Re: what is stopping us achieving this? A requirement to take it seriously.

Government agencies need to be funded and directed - (where there are gaps) to hire skilled people to develop an ongoing asset management approach, do a stocktake of their assets and develop a forward plan – with options within affordability constraints and supporting cost/benefit. Learning from where it works well.

Monitoring and reporting on asset management is needed.

Resilience: Preparing for greater disruption

12. How can we improve the way we understand and manage risks to infrastructure? What's stopping us from doing this?

This requires a multifaceted approach, including better risk identification and understanding of and use of risk information, data collection and analysis, use of resilience engineering, and collaboration across stakeholders.

Within this we suggest that:

Careful rebuilds

- *Care is needed in the rush to rebuild following any hazard event – that the Government is not disproportionately spending the nations funding to rebuild and, in some cases, build back better in one area – at the expense of other sectors and locations. This needs to be carefully assessed when responding to events – albeit quickly sometimes in emergency situations.*

Expedite having an integrated hazards map

- *There has long been discussion in NZ of the need for an integrated hazards map – overlaying GIS information from multiple sources. No one Government agency has yet been able to lead/fund and deliver this (although we understand NEMA might be considering this). It is vital to assist with the 4 areas of emergency management: reduction, readiness, response and recovery. This information would assist manage risks to infrastructure and help with planning future investment and maintenance. There is widespread support in the industry for such a map – but regulatory support and funding might be needed to enable someone to lead this and speed up its delivery.*

National policy on climate issues

- *There would be benefits in a clear national policy on climate issues such as managed retreat, secondary stormwater paths and flood zones. Currently Council plans can permit houses and infrastructure to be built in hazardous locations.*

Working with Insurance Council

- *Can there be closer work with the Insurance Council to ensure clear signals for homeowners or asset owners re the risks relating to climate issues?*

More nature-based solutions

- *Can there be greater integration of classes of land to ensure that flood prone zones or sensitive areas are protected by using wetlands etc?*

13.

Decarbonisation: A different kind of challenge

13. How can we lower carbon emissions from providing and using infrastructure? What’s stopping us from doing this?

Electricity Infrastructure

As we electrify our economy, we must take care to consider our current infrastructure assets and new assets.

We agree that the Plan needs to factor in that New Zealand is likely to need more electricity infrastructure, particularly low emission generation options like solar, geothermal and wind.

With more electric appliances and vehicles entering our society, we are more reliant on our national electricity grid and our distribution networks.

Work must continue to ensure that the critical infrastructure is well maintained, and practices are improved.

We consider Government needs to review the economic model for power generation and consider ‘dry-year’ storage solutions to ensure it has the right incentives for a sustainable & predictable power system.

Emissions reduction

New technologies such as low-carbon concrete, using recycled materials in composites, laminated timber and passive heating systems are all options to consider to help reduce the emissions we generate when we build and maintain infrastructure.

Theme 3: Getting the settings right

Institutions: Setting the rules of the game

14. Are any changes needed to our infrastructure institutions and systems and, if so, what would make the biggest difference?

More role clarify and refinement recommended

In our view it is still not clear exactly how all the central government agencies with a role in infrastructure will work together. For instance – where does Treasury fit in this process – and its usual role of assessing Business Cases. Further, for such a small country – we have a lot of organisations involved with the regulatory system and with delivery and consider further rationalisation should be considered.

Review of Better Business Case approach

We are hearing of some issues with the Treasury Better Business Case approach and think it is timely for a review. For instance – we understand cost is being brought into the analysis late and options that New Zealand cannot afford are taking up time and resources being analysed because they meet objectives.

Prioritise building systems reforms

A reduction in the number of BCAs and local councils would support the direction of the infrastructure reforms by improving efficiency and consistency in the building consent process.

Network pricing: How we price infrastructure services impacts what we think we need

15. How can best practice network pricing be used to provide better infrastructure outcomes?

We support your comments re best practice goals and principles for pricing network infrastructure.

We endorse progress being made in using better pricing practices, particularly usage-based charges, in land transport, water and waste infrastructure.

Regulation: Charting a more enabling path

16. What regulatory settings need to change to enable better infrastructure outcomes?

Prioritise building systems reforms

It is our view that a reduction in the number of BCAs and local councils will support the direction of the infrastructure reforms by improving efficiency and consistency in the building consent process.

Funding and regulatory support for asset management

A lot of the change noted in this submission can occur within the current regulatory settings – with the appropriate reinforcement from Ministers and Chief Executives. Asset management requirements may benefit from some regulatory reinforcement.

Section five: What happens next?

17. Do you have any additional comments or suggestions that you would like us to consider as we develop the National Infrastructure Plan?

Quality

There is little focus on the quality of outcomes within the report. This needs to be considered as part of the cost benefit analysis. Connected to this is our management of standards and building to appropriate standards.

Standards

We recommend there are improvements to the funding and delivery model for standards.

The issues include:

- New Zealand is suffering from a lack of investment and inefficiencies within the standard system, with outdated (or non-existent) standards creating risk for design and manufacturing.

- *updating these standards is expensive, and funding is limited, with only a small proportion of the building levy used on standards. We understand the levy funding only covers Standards New Zealand costs, with technical expert input expected to be on a volunteer basis. This leaves updates unplanned, ad hoc and often - dependent on private funding, which is not readily available or risks industry capture.*
- *New Zealand's participation in joint Australian/New Zealand standards is minimal.*
- *there is a disconnect between standards and regulations – so even when standards are updated, those updates may languish as uncited in regulation.*
- *New Zealand is getting left behind in safety standards and practices and could also become uncompetitive or unsafe.*

We recommend:

- *greater use of the Building Levy to fund a standard's revamp, and some public funding for standards in recognition of the public element to this work.*
- *that additional funding is accompanied by a standards strategy and programme of prioritised work addressing the key issues and gaps.*

We acknowledge and welcome the review by MBIE that has started into the standards funding and delivery process and are looking forward to inputting into the review.