Transport Infrastructure Capital Projects (TICP) Review

Final Report

Client: New Zealand Transport Agency (Waka Kotahi)

Date: 16 December 2024

[CONFIDENTIAL]

Ken Kanofski Advisory

with

E3 Advisory

Limitations of this Report

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It has been prepared to document the Transport Infrastructure Capital Projects Review undertaken by Ken Kanofski Advisory and E3 Advisory. The review was undertaken to provide the NZTA Board with an opinion on NZTA's ability to deliver transport infrastructure capital projects efficiently and support the Government's transport outcomes; identify what the key risks are to success; and provide recommendations to improve future agency performance. It should not be used for any other purpose without prior approval from Ken Kanofski Advisory and E3 Advisory.

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Executive summary

Purpose and scope of the Review

A new Government was elected in New Zealand in October 2023. The new Government has set an ambitious programme for the expansion of New Zealand's transport network and plans to significantly increase investment in capital transport projects. This will result in very significant growth in the NZTA capital project pipeline.

The NZTA Board wants to ensure that NZTA is well equipped to successfully deliver the expanded project pipeline. It is also seeking assurance that NZTA will be able to efficiently and effectively deliver the increasing project pipeline and support the Government's transport outcomes.

The Board engaged Ken Kanofski of Ken Kanofski Advisory to undertake an impartial review of NZTA's ability to deliver transport infrastructure capital projects efficiently and support the Government's transport outcomes, and identify what the key risks are to success. E3 Advisory was engaged to support Ken Kanofski undertake the Review.

The Review covers the end-to-end capital project delivery lifecycle from the approval of the investment decision through to completion of construction. It includes:

- assessment of NZTA's capital project delivery performance using a sample of twenty projects (NZTA Benchmark Projects) and benchmarking these against the performance of Australian Peer Agencies;
- review of NZTA's key capital project delivery processes against the elements that should be present in an effective delivery framework (Effective Delivery Framework Assessment);
- high-level review of the systems and people supporting capital project delivery including contract models, digital and internal capacity, and benchmarking against Peer Agencies (Systems, People and Innovation Enablers Review);
- identification of key issues and risks that impact NZTA's effective and efficient capital project delivery; and
- the provision of recommendations to address the key issues and risks and improve future agency performance.

Out of scope items include maintenance and operations, local road investments and projects delivered by Approved Organisations, change management processes, organisational structure, past reviews, assessments and findings, and the appropriateness of existing reform programmes and their implementation.

Unique aspects of the capital project delivery environment that impact performance

The assessment of NZTA's capital project delivery performance involved a comparison of NZTA's performance against Australian Peer Agencies' performance to determine the relative performance. However in undertaking this assessment some of the unique aspects of the New Zealand market need to be understood and considered, including:

- **labour costs**: it was found that the cost of labour in New Zealand was significantly lower than Australia by approximately 2.5 times. The cause of this difference in predominantly the differences in the industrial environment which in Australia is driven by Enterprise Bargaining Agreements (EBAs) with key unions and associated standard conditions such as the Best Practice Industry Conditions (BPIC) in Queensland.

- **regulatory environment:** Interviewees identified complexities of the New Zealand regulatory environment and the impact this has on the delivery of NZTA's capital projects, particularly in consenting and property. The regulatory environment is considered more complex in New Zealand than in comparable Australian jurisdictions.
- **physical context**: New Zealand is subject to seismic activity that is generally not a factor in Australian road infrastructure, as well as greater geological variability and more mountainous terrain than generally experienced in Australian state jurisdictions.
- **market context and competition for resources**: The New Zealand contractor market is much smaller and less diverse than in Australia. It has very few Tier 1" contractors capable of constructing large road projects (or packages within a single very large road project) and virtually no "Tier 2" market capable of self-delivering small to medium sized road projects. The New Zealand consultant market is similarly limited and a number of the participants operate in Australia as well as New Zealand. Professionals have high mobility between New Zealand and Australia. With a high differential in professional labour costs, both NZTA as a client organisation, and the broader New Zealand consultant industry, will face significant future challenges in providing the capabilities and capacity of professional staff needed to deliver the proposed Government infrastructure pipeline.
- **clarity on the future pipeline of work**: NZTA does not have a long-term (ten year plus) pipeline of projects that is visible to the industry. As a result, neither contractors nor consultants will have the confidence to invest to grow local capability and capacity. Potential new entrants are also unlikely to enter the market while the future work horizon is unclear. By contrast, Australian jurisdictions have used longer term pipeline documentation to support the expansion of both local contractor and consultant capacities, and to attract new contractors (and skills) to the construction sector through a combination of start-up establishment and acquisition.

Overall findings of the Review

NZTA is a competent capital delivery agency that achieves similar but less consistent cost outcomes and seemingly worse time outcomes than Peer Agencies when delivering capital projects. Projects under perform against business case cost estimates, both in terms of the number of projects that run over initial estimates and the magnitude of those overruns.

The key factors causing cost over runs against business case include:

- shortcomings in project definition, risk management, contingency, and application of escalation in the business case and project development phase; and
- over reliance on alliance contracting and poor cost performance of alliance contracts.

NZTA has defined processes for most elements of the capital delivery process, however, these processes are applied inconsistently in projects and there are inadequate accountability and assurance functions to ensure compliance and to lift standards.

The difference in cost outcomes for average projects compared to a small number of outlier projects, which have very high costs, suggests there are substantial overall portfolio cost improvements that can be achieved by improving the consistency of project development and delivery.

NZTA and the market in New Zealand will face capability and capacity constraints in attempting to deliver the planned larger portfolio of works. As the major player in the New Zealand market, the bulk of the cost of these capacity constraints will fall to NZTA. Although it will be challenging, there are opportunities for NZTA to help both grow and shape the market to better meet its needs.

NZTA aims to be an informed and involved client, however it lacks both the capability and capacity in its internal resourcing to effectively play that role. Increasing the number and capability of internal resources will likely improve the overall time, cost and quality outcomes across the portfolio.

There are a number of differences in the environment faced by NZTA compared to its peers on the east coast of Australia. The differences with the most impact are:

- construction labour cost (and price) is much higher in Australia. This will impact on NZTA's and the New Zealand market's capacity and capability constraints.
- the consenting environment in New Zealand for road projects is more challenging.
- NZTA has much less certainty in its project pipeline than its Australian peers.

The Review has identified four foundational issues that are most impacting NZTA's ability to efficiently and effectively deliver its capital projects. NZTA's performance in capital project delivery will remain sub-optimal while any of these foundational issues are not effectively addressed.

These foundational issues are:

1) inadequacies in accountability;
2) lack of in-house capacity and / or capability;
3) shortfalls in risk management and contingency; and
4) limited independent assurance.

The Review has also identified six essential elements that are impacting NZTA's ability to efficiently and effectively deliver its capital projects. Addressing these will result in significant improvements in NZTA's performance in capital project delivery.

These essential elements are:

1) increasing the certainty of the capital project pipeline;
2) improving project definition in the Detailed Business Case (DBC);
3) optimising the delivery model for projects;
4) shaping and growing the market;
5) including escalation in cost estimates; and
6) minimising post-business case budget adjustments.

Finally, the Review has identified six improvement opportunities and enablers. Addressing these will result in improvements in NZTA's performance in capital projects delivery. These are:

- improving processes and systems;
- improving consultant performance;
- maximising continuity and capability of key personnel;
- increasing use of digital;
- providing pre-pipeline seed funding; and
- implementing a programme approach to disaster recovery.

The findings and recommendations associated with the foundational issues, essential elements and improvement opportunities are provided in sections 4, 5 and 6.

1 Introduction

1.1 Introduction and purpose

A new Government was elected in New Zealand in October 2023. The new Government has set an ambitious programme for the expansion of New Zealand's transport network and plans to significantly increase investment in capital transport projects. This will result in very significant growth in the NZTA capital project pipeline. The pipeline is currently forecast to increase to a peak of about $4Bn in 2030/31, with a total expenditure of $27Bn expected over the next ten years, refer to Figure 1.

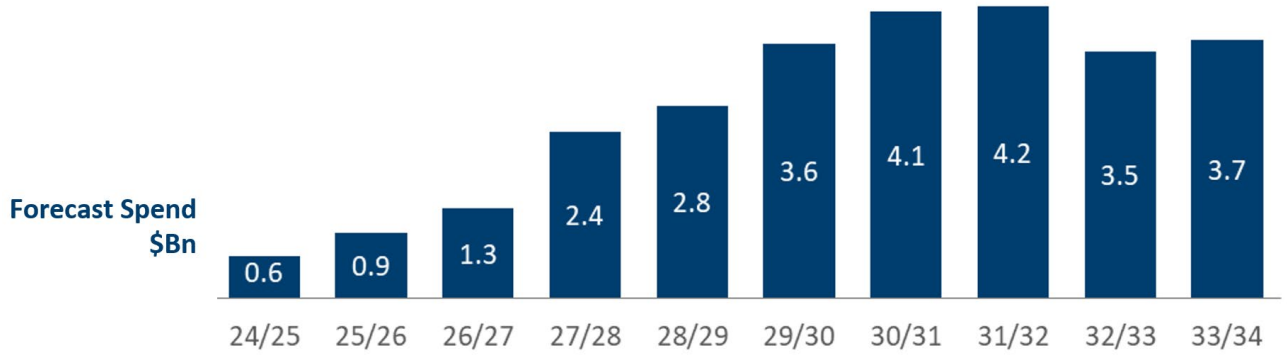


Figure 1: Indicative NZTA capital project forecast spend as of June 2024[1]

The delivery of an increasing pipeline presents a major challenge to NZTA given the scale of the increase, the ambitious delivery timeframes, and the existing capacity of the road infrastructure industry (consultants and contractors) in New Zealand. The NZTA Board wants to ensure that NZTA is well equipped to successful deliver the expanded project pipeline. It is also seeking assurance that NZTA will be able to efficiently and effectively deliver the increasing project pipeline and support the Government's transport outcomes.

The Board engaged Ken Kanofski of Ken Kanofski Advisory to undertake an impartial review of NZTA's ability to deliver transport infrastructure capital projects efficiently and support the Government's transport outcomes, and identify what the key risks are to success. E3 Advisory was engaged to support Ken Kanofski undertake the Review.

1.2 Details of the Review

1.2.1 Scope, timing and outputs

The Review scope covers the end-to-end capital project delivery lifecycle from the approval of the investment decision through to completion of construction. It includes:

- assessment of NZTA's capital project delivery performance using a sample of twenty projects (Benchmark Projects) and benchmarking these against the performance of Australian Peer Agencies;
- review of NZTA's key capital project delivery processes against the elements that should be present in an effective delivery framework;

[1] Source: NZTA

- high-level review of the systems and people supporting capital project delivery including contract models, digital and internal capacity, and benchmarking against Australian Peer Agencies;
- identification of key issues and risks that impact NZTA's effective and efficient capital project delivery; and
- the provision of recommendations to address the key issues and risks and to improve future agency performance.

Figure 2 provides further details on the Review scope and specifically what were specified as "out of scope" elements.

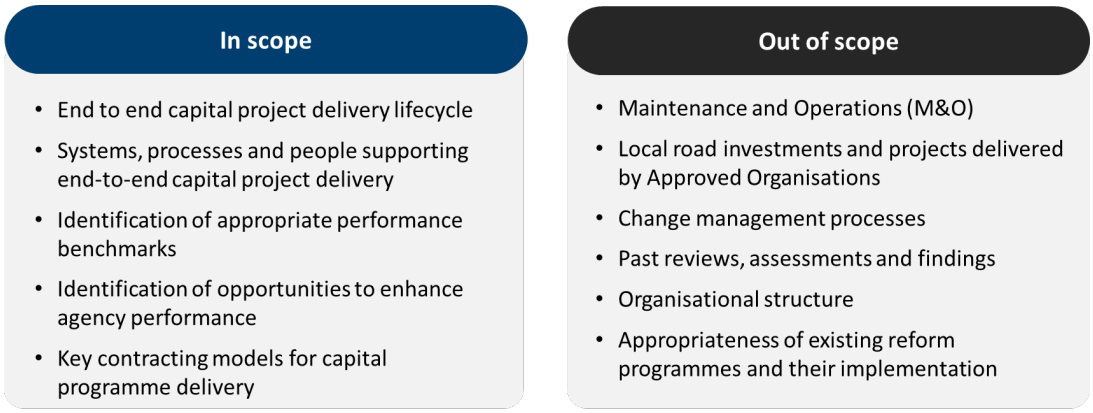


Figure 2: Review scope

The Review was undertaken over a 12-week period from August to October 2024. Figure 3 provides a summary of the key activities undertaken by the Review Team.

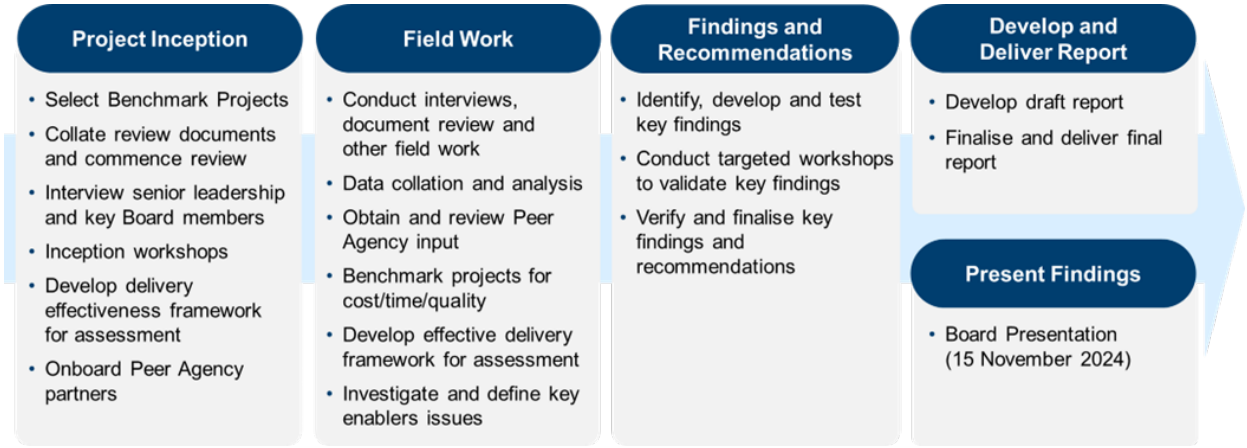


Figure 3: Review activities and timeline

The key outputs from the Review are:

- a presentation for the November 2024 NZTA Board meeting summarising the review process, findings and recommendations; and
- this report, documenting the review process, findings and recommendations.

1.2.2 Information relied upon

The Review relied on interviews, workshop feedback and documents provided by NZTA.

NZTA project and process documents were provided to the Review Team via NZTA's OpenText / Core Share data sharing system. This included over 200 artefacts and process documents, as well as project specific data for the Benchmark Projects.

Over 60 interviews were conducted with Board members, subject matter experts, industry partners and NZTA executives, senior managers and project personnel. Three inception workshops and two ideation workshops were held with NZTA senior managers and executives.

Peer Agency project and process documents were obtained from Peer Agencies and publicly available sources.

1.2.3 Review Team

The Review Team, and their roles, is provided in Table 1.

Table 1: Review Team and roles

Name	Role	Company
Ken Kanofski	Lead Reviewer	Ken Kanofski Advisory
Andrew Allen	Outcomes Workstream Lead	E3 Advisory
James Restuccia	Processes and Enablers Workstream Lead	E3 Advisory
Annie Ha	Analyst	E3 Advisory
Matthew Schnelle	Analyst	E3 Advisory
Matthew Sin	Research Assistant	E3 Advisory
Peter Gemell	Peer Reviewer	Peter Gemell and Associates
Peter Byford	Peer Reviewer	E3 Advisory
Peter Cuk	Peer Reviewer	E3 Advisory

1.2.4 Acknowledgements

The Review Team wishes to acknowledge the assistance of the NZTA personnel who provided information and participated actively in interviews and workshops. The NZTA personnel demonstrated genuine engagement and a willingness to positively contribute to the review process.

The Review Team also wishes to acknowledge NZTA's Efficiency and Effectiveness Team for their extensive support, coordination, feedback and input. This was invaluable particularly given the breadth of the Review and the limited Review timeframe.

2 Unique aspects of the capital project delivery environment that impact performance

The Review requires an assessment of NZTA's ability to deliver transport infrastructure capital projects efficiently and support the Government's transport outcomes. The assessment must consider the Government's planned significant increase in investment in capital transport projects.

The Review involves benchmarking NZTA's performance against Australian Peer Agencies. In making such comparisons it is important to recognise that the road sectors in New Zealand and Australia have some significant differences, including:

- labour costs;
- regulatory environment;
- physical context;
- market context and competition for resources; and
- clarity on the future pipeline of work.

2.1 Labour costs

Figure 4 provides a comparison of construction input costs between New Zealand and Australia. The data is derived from the Benchmark Projects (particularly alliance projects where cost data is readily available) and E3 Advisory's database.

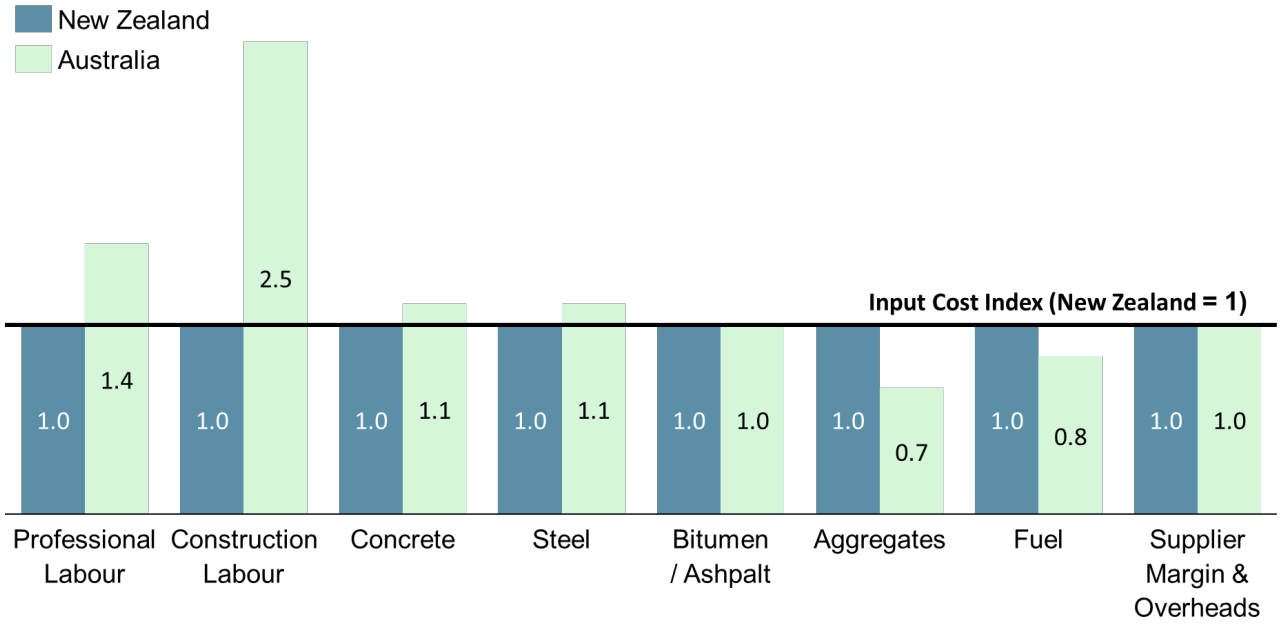


Figure 4: Construction input costs – New Zealand relative to Australia[2]

The standout difference between the New Zealand and Australian markets is unit construction labour cost. This finding is consistent with an earlier report by the New Zealand Infrastructure Commission (NZIC)

[2] Source: Supplier contracts and quotations on major transport construction projects

(December 2022)[3], but with the differential having grown significantly in the last two years. This reflects the over-heated nature of the Australian construction market and more robust union activity on major infrastructure projects throughout Australia over recent times.

Aggregating these costs, we conclude that overall unit construction costs in New Zealand is approximately 80% of the equivalent unit construction costs in Australia for road infrastructure projects. This reflects the relatively significant impact of much lower construction labour costs, coupled with relative equivalence in material costs, equipment costs, and contractor margin and overhead.

The differentials in both construction labour costs and professional labour costs between New Zealand and Australia will also be significant when NZTA and the New Zealand construction industry attempt to address capacity and capability shortages in the New Zealand market. This is discussed further in sections 2.4 and 5.4.

2.2 Regulatory environment

Interviewees identified complexities of the New Zealand regulatory environment and the impact this has on the delivery of NZTA's capital projects. Consenting and property acquisition were frequently referenced.

Consenting

The consenting environments of New Zealand and Australia are significantly different.

In New Zealand the consenting authority is either a regional or local council. New Zealand does not operate an independent Government consent authority as found in most Australian states. This is further complicated by consent conditions being established through a court process rather than by determination of the consenting authority. In effect, the court becomes the consenting authority. Interview feedback identified that "nearly all projects end up in court [for consenting]".

Interview feedback also stated that the consenting process has resulted in non-critical scope being added to some of NZTA's projects.

By contrast, Peer Agencies operate in an environment where 'state significant projects' are determined by an independent state authority (e.g. Department of Planning, Housing and Infrastructure in New South Wales); and for projects that meet relevant criteria, the State transport agency is a self-determining authority. In practical terms, this appears to allow Australian projects to proceed more quickly from business case to project implementation with reasonable certainty about consent conditions.

Court challenges to consent approvals for transport infrastructure projects in Australia are the exception, rather than the rule.

Property

New Zealand and Australian state jurisdictions have several commonalities in terms of property – all operate with compulsory acquisition powers over privately owned land and both countries have native title legislation that prevents the compulsory acquisition of lands held under native title.

The Review has identified one significant difference that may impact some NZTA projects. A court challenge to compulsory acquisition in New Zealand can challenge both the right of acquisition and the value of the subject property; whereas in Australia generally the transfer of title cannot be challenged, only the value of the property in question. This may allow Australian projects to have certainty on property access more quickly than NZTA can achieve on its projects.

[3] New Zealand Infrastructure Commission Te Waihanga, 2022, "The lay of the land: Benchmarking New Zealand's infrastructure delivery costs"

Having said this, we have been advised that most properties on NZTA projects are purchased by private treaty and only 1% end up in property court challenges.

2.3 Physical context

Some distinct differences in physical context apply to capital road project delivery in New Zealand and Australia.

New Zealand is subject to seismic activity that is generally not a factor in Australian road infrastructure. As this is a design issue, it may impact the cost of some NZTA projects, but should not significantly impact the time to deliver those projects.

New Zealand is also subject to greater geological variability and more mountainous terrain than generally experienced in Australian state jurisdictions (but that is not to say that individual Australian projects do not have challenges of soft soils, variable ground conditions in tunnelling, etc.).

The physical context of projects should be largely de-risked during the development phase of any project but may impact the time and cost to deliver some NZTA projects.

2.4 Market context and competition for resources

The Australian capital infrastructure pipeline, which includes many large-scale projects in delivery, is well documented and significantly larger than the New Zealand national infrastructure pipeline.

The New Zealand transport infrastructure pipeline (public and private sector) is currently valued at over $60Bn, with expenditure growing and remaining at high levels until 2028 as shown in Figure 5.

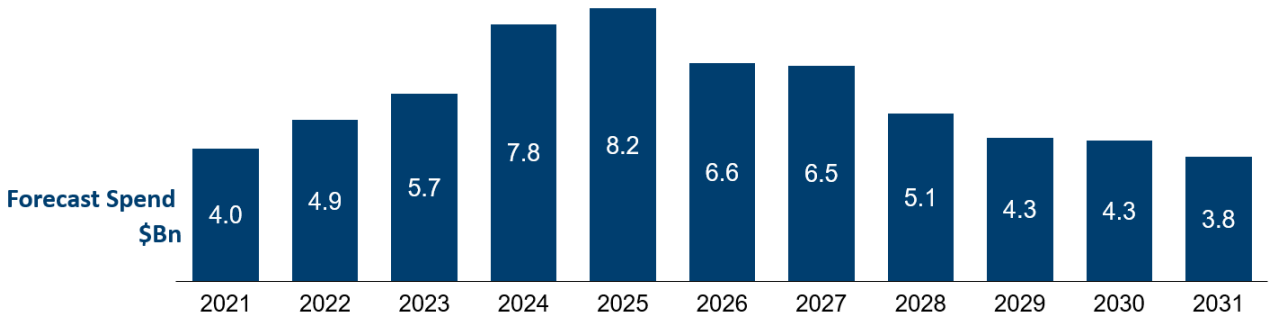


Figure 5: New Zealand transport infrastructure pipeline (public and private sector)[4]

The Australian transport infrastructure pipeline (public and private sector), as shown in Figure 6, is valued at $210Bn over five years from 2023[5].

[4] Data source: The New Zealand Infrastructure Commission (Te Waihanga)
[5] Infrastructure Australia, 2023, Infrastructure Market Capacity 2023 Report

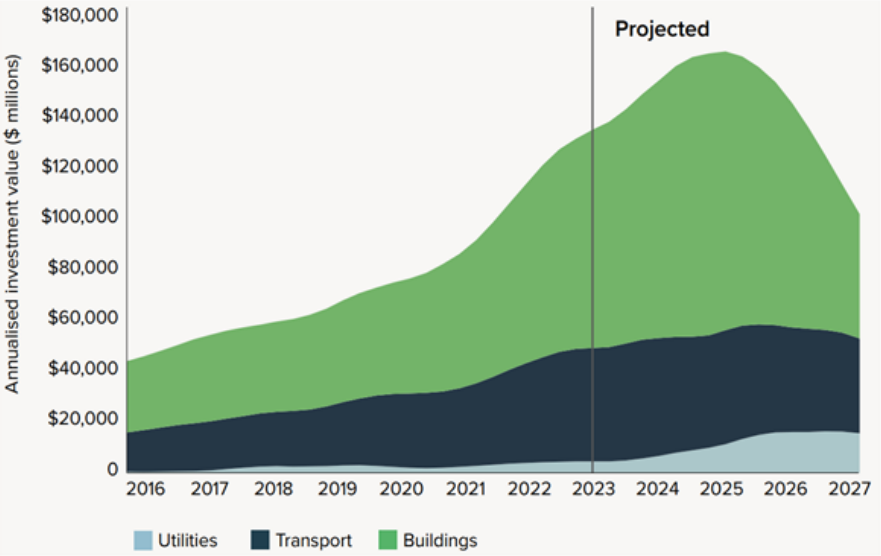


Figure 6: Australian transport infrastructure pipeline (public and private sector)[6]

This difference in the size of markets is historically consistent and has shaped the New Zealand contractor and consultant markets compared to their Australian equivalents.

The New Zealand contractor market is much smaller and less diverse than in Australia. It has very few "Tier 1" contractors capable of constructing large road projects (or packages within a single very large road project), and virtually no "Tier 2" contractors capable of self-delivering small to medium sized road projects. The structure and capacity of the New Zealand contractor market and the impact this will have on delivering NZTA's expected future pipeline of projects is discussed in section 5.4.

The New Zealand consultant market has several major participants who provide a broad range of technical services to NZTA. A number of these consultancies have associated companies in Australia. Professionals have high mobility between New Zealand and Australia. With the differential in professional labour costs shown in Figure 4, both NZTA as a client organisation, and the broader New Zealand consultant industry, will face significant future challenges in providing the capabilities and capacity of professional staff needed to deliver the proposed Government infrastructure pipeline.

The issues of NZTA capability and capacity are further discussed in section 4.2.

2.5 Clarity on future pipeline of projects

The importance of having a documented future pipeline of projects is discussed in section 5.1. Recent national and international studies have suggested that such a pipeline can result in longer term reduction in costs:

- the New Zealand Infrastructure Commission (NZIC)[7] recommended "*strengthening independent advice for infrastructure prioritisation… and establishing a pipeline of future investment… to help lift productivity and reduce costs*"; and
- the (UK) National Infrastructure commission[8] observed that it "*could be an essential tool for providing industry confidence and drive down cost*".

[6] Infrastructure Australia, 2023, Infrastructure Market Capacity 2023 Report
[7] New Zealand Infrastructure Commission Te Waihanga, 2022, "The lay of the land: Benchmarking New Zealand's infrastructure delivery costs"
[8] National Infrastructure Commission, 2024, "Cost drivers of major infrastructure projects in the UK"

NZTA does not have a long-term (ten year plus) pipeline of projects that is visible to the industry. As a result, neither contractors nor consultants will have the confidence to invest to grow local capability and capacity. Potential new entrants are also unlikely to enter the market while the future work horizon is unclear.

By contrast, Australian jurisdictions have used longer term pipeline documentation to support the expansion of both local contractor and consultant capacities, and to attract new contractors (and skills) to the construction sector through a combination of start-up establishment and acquisition. This includes globally significant contracting organisations such as CPB, CCCC, Vinci, Acciona, Ferrovial and Laing O'Rourke.

3 NZTA's ability to efficiently and effectively deliver capital projects

3.1 Overall performance assessment

NZTA is a competent capital delivery agency that achieves similar but less consistent cost outcomes and seemingly worse time outcomes than Peer Agencies when delivering capital projects.

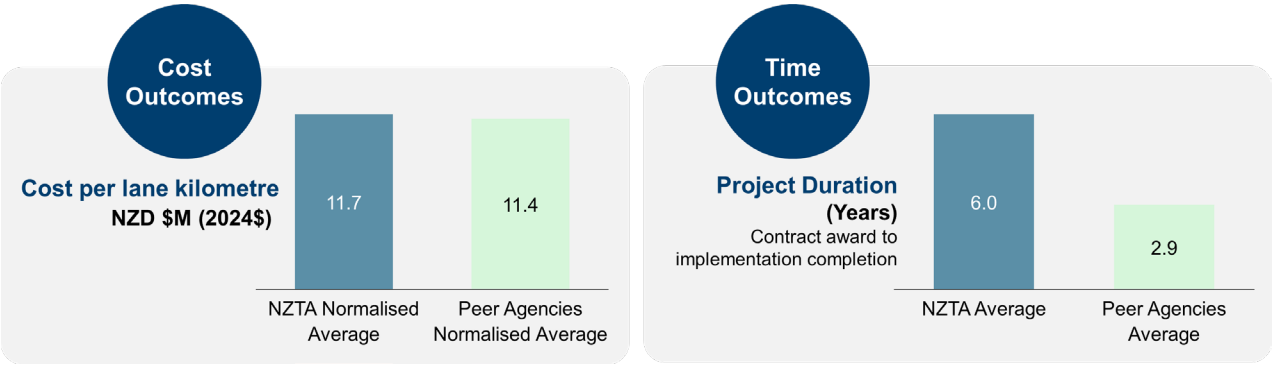


Figure 7: NZTA Agency performance relative to Peer Agencies

Quantitative evidence of the cost performance of NZTA delivering projects is provided in section 3.2, in particular a comparison of normalised construction cost per lane kilometre between Benchmark Projects and Peer Agencies' projects. Based on what are small data sets of projects (20 Benchmark Projects and 25 Peer Agencies' projects), our Review suggests an average normalised NZTA construction cost of $11.7M per lane kilometre (2024$), which is very similar to the $11.4M per lane kilometre (2024$) achieved by Australian Peer Agencies. As these are normalised costs (refer to section 3.2.1 for an explanation of the adjustments), we can conclude that NZTA delivers its capital projects with similar efficiency to Australian Peer Agencies overall.

This conclusion is supported by the following qualitative observations made by industry participants during the Review:

- NZTA has been successfully delivering projects throughout New Zealand for many years; and
- NZTA is regarded as the best Government agency delivering capital works projects in New Zealand.

In 2022, the NZIC[9] also provided some comparative data on the unit costs of New Zealand urban motorway and rural motorway projects, by comparing unit costs with Australia and the much larger markets of Europe and North America. The NZIC showed that the median unit cost of New Zealand urban motorways is very similar to that of Australia (and Europe, but all are higher than North America) and the median unit cost of New Zealand rural motorways is significantly lower than Australia (but higher than both Europe and North America).

In addition, the Review Team has carried out several internal benchmarking comparisons on the Benchmark Projects, namely:

- actual outturn project cost (or latest forecast of outturn cost) versus P50 and P95 DBC estimates of project cost;

[9]New Zealand Infrastructure Commission Te Waihanga, 2022, "The lay of the land: Benchmarking New Zealand's infrastructure delivery costs"

- large project cost performance versus medium and small project cost performance; and
- performance across different contract models.

These comparisons all point to substantial variability in performance across NZTA's portfolio of capital projects.

The Review also looked at project time outcomes, to the extent possible given the data provided and the time available for the Review. We have observed that:

- average time from completion of the DBC to commencement of construction appears to be much greater on NZTA projects than Peer Agencies' projects; and
- average time for construction of NZTA projects appears to be considerably longer than Peer Agencies' projects of a similar size and complexity.

Given the limited data sets, we are cautious in drawing firm conclusions in relation to time. We are inclined to conclude that these comparisons point to some systemic issues encountered by NZTA in delivery of capital projects, which are discussed in detail in sections 4 and 5.

3.2 Cost outcomes

3.2.1 Benchmark construction costs per lane kilometre

Key finding

→ **The average normalised construction cost for NZTA projects is $11.7M per lane kilometre, which is reasonably consistent with Peer Agencies that average $11.4M per lane kilometre**, as shown in Figure 8 and Figure 9.

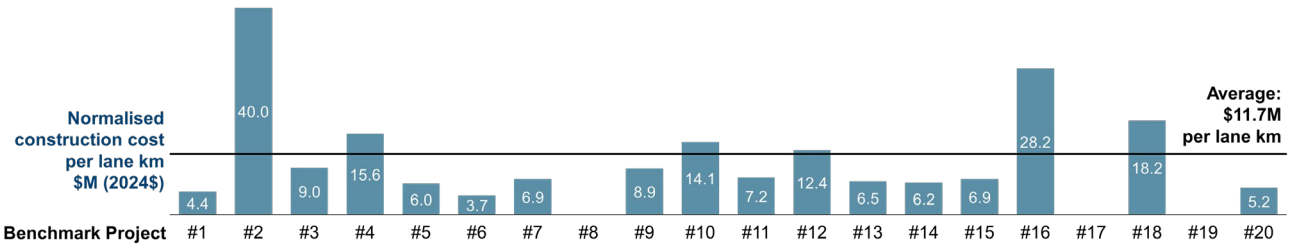


Figure 8: Benchmark projects – construction cost per lane kilometre

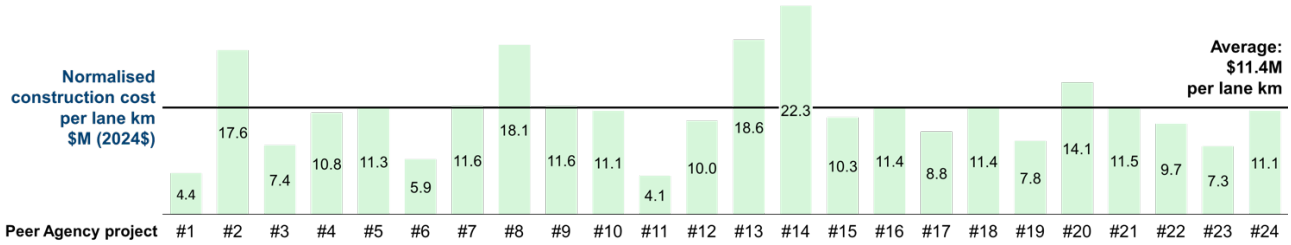


Figure 9: Peer Agency projects – construction cost per lane kilometre

The values presented in Figures 8 and 9 are normalised lane kilometre costs for each project. This is done by adjusting in terms of escalation (all cost estimates have been adjusted to 2024$); exchange rate between NZ$ and AUD; a project complexity adjustment (brownfield v greenfield construction; urban road project v rural road project; surface works v tunnelling v major bridge structures) to allow comparison

between otherwise different project types and input costs, of which construction labour is by far the most influential differentiator between the New Zealand and Australian markets (refer to section 2.1). The impact on Peer Agencies' projects is shown in Figure 10.

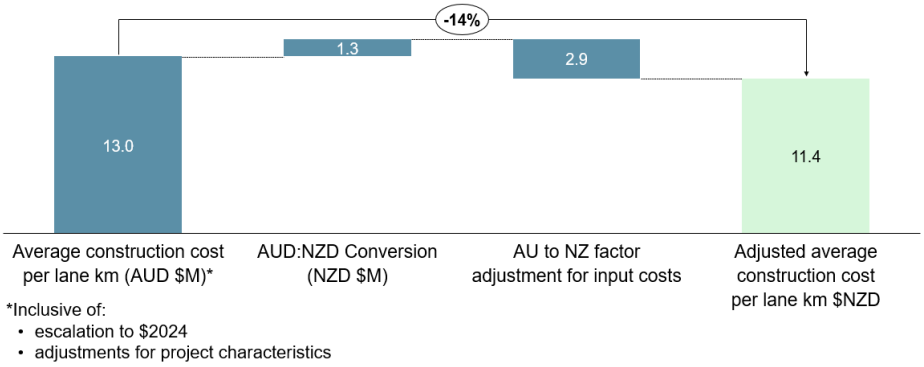


Figure 10: Adjustments to Peer Agency average construction cost per lane kilometre

With these four adjustments and all other things being equal, the cost per lane kilometre should be the same between data sets if NZTA's performance is similar to that of Peer Agencies. This is in fact the case.

The Mt Messenger project is a significant outlier within the NZTA project data set. For the purposes of comparison with the Peer Agencies' data set we have not excluded the Mt Messenger project as the Australian data set also contains some "spike" projects. However, it is worth noting that the average NZTA cost per lane kilometre falls from $11.7M to $10.0M if the Mt Messenger project is excluded. This highlights the improvements in cost performance that can potentially be achieved if occasional outlier projects can be eliminated from a portfolio of completed projects.

3.2.2 Performance against the detailed business case project cost estimate

Key findings

→ 11 of 16 Benchmark Projects[10] exceeded their P95 detailed business case (DBC) cost estimate (after adjusting for escalation), as shown in Figure 11.

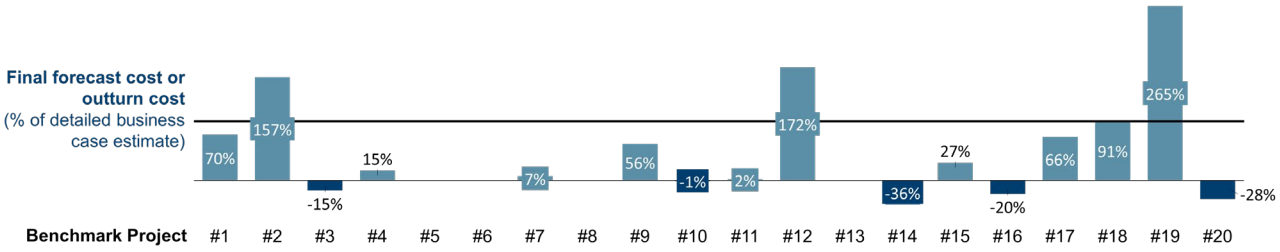


Figure 11: Benchmark Projects – Performance against detailed business case

→ Tendency for larger projects (greater than $500M) to more frequently have cost overruns and the magnitude of those cost overruns as a percentage of the DBC estimate are larger than for smaller and medium sized projects undertaken by NZTA. This is shown in Figure 12.

[10] Metric excludes projects without a detailed business case or those currently in the business case phase

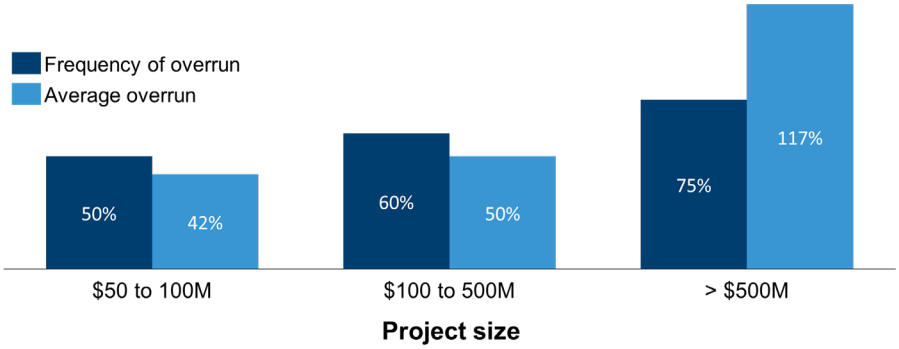


Figure 12: Benchmark Projects – Frequency and magnitude of overruns

→ Tendency for alliance contracts to result in more substantive cost overruns compared to fixed price contract models, as shown in Figure 13.

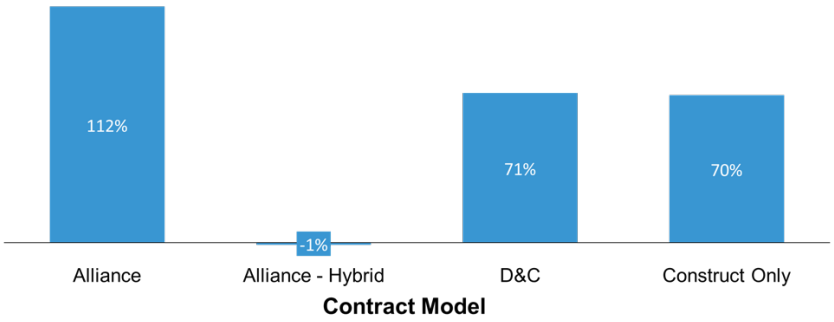


Figure 13: Benchmark Projects – Average overruns by contract model

Figures 11 to 13 all indicate substantial variability in cost performance across NZTA's portfolio of capital projects, when compared to the DBC estimates of project cost.

The frequency of exceeding P95 cost estimates is worse than our collective experience with Peer Agencies (where large projects are generally funded to the P90 level of cost estimate).

The NZTA experience with cost overruns being more frequent and of greater magnitude for large projects is consistent with what has been observed in Peer Agencies. It is also consistent with a study by the Grattan Institute of all transport projects constructed in Australia between 2001 and 2016[11]. In short, all jurisdictions appear to struggle with the delivery of high value and/or high risk projects.

NZTA's experience with cost overruns on its alliance projects is inconsistent with Peer Agencies. NZTA alliance contracts had an average overrun of 112% above the P95 DBC cost estimate, which is significantly higher than our collective experience with Peer Agencies.

3.2.3 Possible causes of cost overruns

The Review Team had insufficient cost data or time available to analyse the Benchmark Projects in detail with the respective project teams, which may have provided greater clarity and quantitative assessment of the cause(s) of cost overruns on individual projects. We can however provide the following observations on the possible causes of cost overruns based on feedback from NZTA interviewees:

[11] Grattan Institute, 2016, "Cost overruns in transport infrastructure"

- insufficient upfront investment in early works to de-risk a project prior to contract award;
- poor project scope definition prior to contract award and/or changes during project implementation, including in relation to changes to consent conditions and property acquisitions;
- projects "rushing" into project implementation without adequate de-risking;
- changes to the authorising environment (including Government policies and legislations), which impact broader project objectives and agency prioritisation of projects;
- inadequate and inconsistent contingency allowances in project cost estimates; and
- COVID impacts, including the disruptions of supply chains.

Many of these causes could be mitigated by the recommendations provided in sections 4 and 5.

3.3 Time outcomes

3.3.1 Performance against programme milestones

Key findings

→ DBCs are being completed well before the commencement of project implementation; and possibly too early. There is a median time lapse of 22 months[12] between these milestones, as shown in Figure 14.

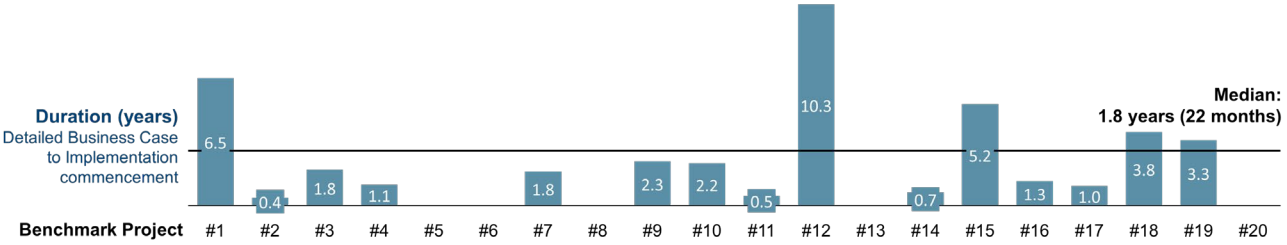


Figure 14: Benchmark Projects – project duration (DBC to Project Implementation commencement)

→ The project implementation phase of Benchmark Projects also appears to be about six years on average, as shown in Figure 15.

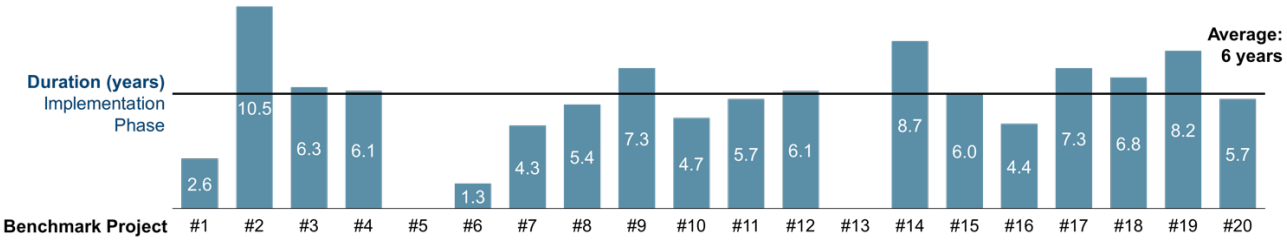


Figure 15: Benchmark Projects – Project duration (Project Implementation phase)

→ All NZTA Benchmark Projects have a longer project implementation phase than forecast in the DBC, as shown in Figure 16.

[12] Note: average time lapse of 34 months

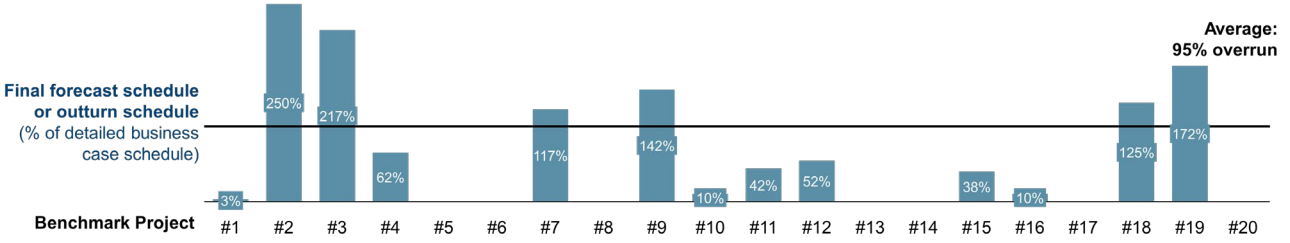


Figure 16: Benchmark Projects – Performance against DBC schedule

The delay from completion of DBC (and presumably funding approval for project implementation) of 22 months is considerably longer than we have experienced in Peer Agencies. Peer Agencies typically award contracts within 6 to 18 months following DBC completion. Given that at least some NZTA projects proceed to project implementation prior to consenting and property issues are fully resolved (as suggested in interviews), we cannot explain why this 22-month delay occurs.

The average construction period of about six years for NZTA projects is considerably longer than we have experienced in Peer Agencies. Peer Agencies on average take about three years to deliver $200 to $500M construction contracts. We believe that the longer construction period is at least partly due to NZTA going into "implementation" before property and consenting are resolved, so the first years of the six-year period are what in Australia would be regarded as pre-implementation design development and consenting activities. This may contribute to the significant cost overruns experienced with alliances as noted in the previous section, and may also relate to the absence of schedule risk analysis (SRA) by NZTA, as discussed in section 4.3.

3.3.2 Possible causes of time overruns

The Review Team had insufficient schedule data or time available to analyse the Benchmark Projects in detail with the respective project teams, which may have provided greater clarity and quantitative assessment of the cause(s) of time overruns on individual projects. We can however provide the following observations on possible causes of time overruns based on feedback from NZTA interviewees:

- lack of portfolio certainty that projects will obtain funding and immediately proceed into project implementation, which may contribute to the delay between DBC and project implementation;
- delays from incomplete consenting and property acquisition prior to the commencement of project implementation, causing delays to the contractor during construction;
- poor constructability and schedule development during the DBC phase;
- late changes to design and construction methodology due to the realisation of contingent risks, including issues related to latent conditions and third parties; and
- lack of SRA application and consideration at each project phase.

Many of these causes could be mitigated by the recommendations provided in sections 4 and 5.

4 Priority 1 – Foundational issues

The Review has identified four foundational issues that are most impacting NZTA's ability to efficiently and effectively deliver its capital projects. NZTA's performance in capital project delivery will remain sub-optimal while any of these foundational issues are not effectively addressed.

These foundational issues are:

- inadequacies in accountability;
- lack of in-house capacity and / or capability;
- shortfalls in risk management and contingency; and
- limited independent assurance.

4.1 Inadequacies in accountability

4.1.1 End to end ownership accountability by an "internal client"

Key Findings

→ **F1.1 NZTA does not have "end to end" ownership accountability for the project.** No individual role or organisational unit "owns" the project as the "internal client" for the whole project lifecycle. Various parts of the agency have responsibility for the project throughout its life, creating handover interfaces that reduce accountability.

→ **F1.2 NZTA does not have a clearly defined investor / client / deliverer accountability split.** Our view is that this is the most effective accountability split for organisations that both operate transport networks and deliver transport capital projects because it creates healthy tension between investor (who provides funding) and client (who must define a project consistent with available funding and network objectives) and between client and deliverer (who must implement the defined project within the funded budget).

"End to end" ownership accountability

NZTA is currently implementing the Portfolio, Programme and Project Model (P3M) to improve the way that maintenance, operations and capital improvements are governed and managed within its Transport Services Division. P3M includes changes to the Transport Services organisational structures, which came into effect on 16 September 2024. As such, Transport Services is currently in the process of transitioning to a new governance framework.

There is no individual role or organisational unit that "owns" the project as the "network owner / network operator / internal client" throughout the whole project lifecycle (i.e. no "end to end" ownership accountability for the project). Various parts of the agency have responsibility for the project throughout its life, which creates potential weaknesses in accountability by blame shifting to predecessors. A single accountable internal client throughout the whole project lifecycle is preferred.

The Project Sponsor role within P3M provides oversight and governance to individual projects, however this role changes over the project lifecycle from the Regional Manager System Design to the Regional Manager Infrastructure Delivery. This creates the potential weakness in accountability noted previously.

The Project Sponsor as defined also does not have the accountabilities expected of an internal client. It would be beneficial for the Project Sponsor to be the "network owner / network operator / internal client",

who is responsible for project and network objectives, project definition, project scope, and obtaining of funding from the investor.

It is unclear whether end-to-end accountability existed prior to the implementation of P3M.

Clearly defined investor / client / deliverer accountability split

NZTA does not have a clearly defined investor / client / deliverer accountability split, which is typically found in Australian state jurisdictions. Our view is that an investor / client / deliverer accountability split achieves better project and portfolio governance by having three distinct streams of accountability, which introduces healthy tension points between investor / client and client / deliverer.

The three streams of accountability are:

Stream 1: Investment and assurance (the "investor")

The investor is accountable for:

- using inputs from Government, the network managers and operators, and modelling of future demand and network usage, to develop a long-term plan and a prioritised portfolio based on indicative project costs to address the highest needs first;
- obtaining and maintaining funding (from various sources - in NZTA's case the Board and the Crown), and for reporting to the funder; and
- providing independent investor assurance to the various funders that projects are providing value for money, risks are being managed, and projects are being developed and delivered in an appropriate manner.

The investor does not develop or deliver projects.

Stream 2: Network management, operations and maintenance (the "internal client")

This stream broadly encompasses accountabilities for roles that reside in System Design and Maintenance and Operations in the current NZTA structure. It also encompasses the setting of standards which currently resides in Portfolio and Standards.

The internal client is accountable for:

- setting of standards;
- carrying out early project development and preparing business cases required to inform an investment decision. This includes taking guidance from both the investor on higher level priorities and objectives, and from Maintenance and Operations on the real time network performance, issues and needs;
- seeking an investment decision from the funders (via the investor);
- approving any changes to the approved budget and/or scope; and
- fulfilling the Project Sponsor role as defined above.

The internal client requires strong general management skills including at the regional level.

Stream 3: Project delivery (the "deliverer")

The deliverer is accountable for:

- delivering time, cost and quality outcomes to the scope that has been approved for delivery by the internal client;
- procurement of projects; and

- keeping the internal client informed on progress and emerging risks.

The deliverer is best viewed as a service provider to the internal client.

A "technical services" group (engineering and other technical skills required for design, business cases, consenting etc) often resides within the deliverer, but this is not essential. Wherever it sits organisationally, it is best viewed as a service provider to both the internal client and the deliverer.

The technical services group provides key inputs and advice in the setting of standards, but the ultimate decision and accountability for setting of standards for a project should rest with the internal client. Standard setting has economic, service and affordability dimensions which need to be balanced against technical judgements.

Creating the three streams of accountability generates healthy tension points such as:

- tension between the internal client and the investor to test the level of investment that is required to achieve various levels of network performance and prioritisation of that investment against available funding;
- tension between the internal client and the deliverer to test whether the scope the internal client requires delivers best value in terms of improving network performance and the standards to which the asset should be delivered;
- tension between the internal client and the deliverer to test whether the scope the internal client requires can be delivered for the budget (including contingency) that has been funded; and
- tension between the internal client and the deliverer by holding the deliverer to account for time, cost and quality outcomes that are set in the DBC and the scope of work and technical criteria.

The investor / client / deliverer accountability split must be clearly defined.

One option that NZTA could consider to make accountability more transparent is the implementation of structural changes, but this is beyond the brief of the Review.

Similarly, whether all three streams of accountability reside within Transport Services with the Group General Manager taking on a Chief Operating Officer type role, as is currently the case, or whether one or more streams sits in separate parts of the NZTA organisation, is really a matter of choice and depends on several factors, not just accountability.

Role of maintenance and operations within the "internal client"

Capital project development and delivery can be considered as part of an asset lifecycle. An example asset lifecycle is shown in Figure 17 below, with capital project development and delivery elements shaded.

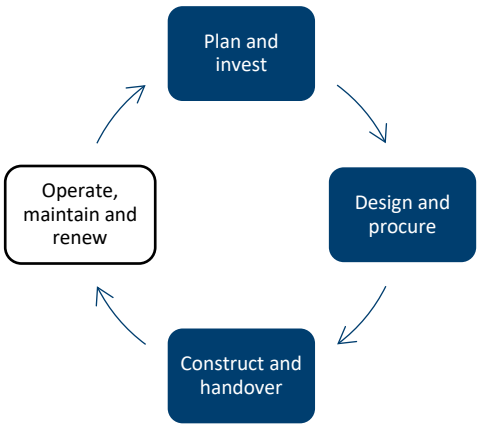


Figure 17: Example asset lifecycle, with capital project development and delivery elements shaded

The maintenance and operation of the network assets is an integral part of the asset lifecycle. As part of the internal client, the Maintenance and Operations business unit provides input into the planning and investment activities. This includes information on the performance and needs of the network.

The Maintenance and Operations business unit also accepts constructed assets from the deliverer, and operates and maintains them as part of the overall network.

It is noted that the Review did not cover the operations and maintenance phase of the asset lifecycle.

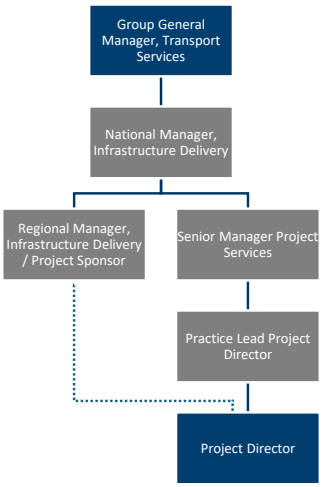
Recommendations

- ✓ **R1.1 Create "end to end" ownership accountability for the project. There are a number of ways to achieve this.** NZTA should review the role of the Project Sponsor and:
  - make it more aligned with an "internal client" (network owner / network operator) who is accountable for the project and network objectives, project definition, project scope and obtaining of funding from the investor, and who subsequently approves the progression of a project from one phase of the project lifecycle to the next
  - allocate a single role as Project Sponsor for the whole project lifecycle
  - ensure that the Project Sponsor does not reside within the Project Delivery stream.
- ✓ **R1.2 Review overall accountabilities within NZTA arrangements considering our view that an investor / client / deliverer accountability split is the most effective.**

4.1.2 Vertical chains of accountability

Key Finding

→ **F1.3 There is no clear chain of project accountability which extends from the Project Director up to the Group General Manager, Transport Services for project delivery, and from the Principal Transport Planner up to the Group General Manager, Transport Services for business case preparation.**



Note: Dark blue shading indicates the roles that have accountability for the delivery of projects

Figure 18: Vertical reporting line between Project Director and Group General Manager, Transport Services

NZTA Project Directors are accountable for the delivery of projects to time and cost from pre-implementation through project delivery. They currently report to a Practice Lead – Project Directors, who

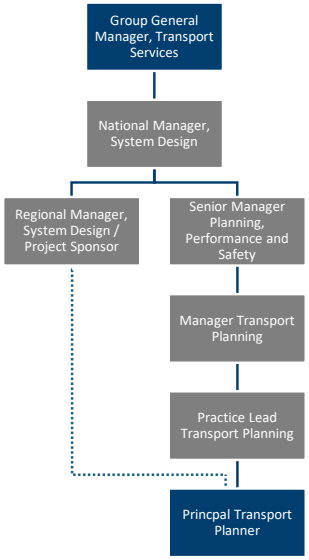
is not accountable for the delivery of projects being led by the Project Directors reporting to them. The Practice Lead - Project Directors reports to the Senior Manager Project Services, who in turn reports to the National Manager Infrastructure Delivery. There was no evidence that the National Manager Infrastructure Delivery is accountable for the projects being delivered nationally.

Project Directors also have a soft reporting line to a Regional Manager Infrastructure Delivery, who is also the Project Sponsor during this phase of the project lifecycle. The Project Sponsor is accountable for project governance and oversight but is not accountable for the delivery of projects being delivered by Project Directors reporting to them. The Regional Manager Infrastructure Delivery also reports to the National Manager Infrastructure Delivery.

These arrangements are illustrated in Figure 18.

Under these arrangements NZTA does not have a vertical chain of accountability which extends from the Project Director (who is accountable for delivering an individual project to time and cost) up to the Group General Manager, Transport Services, who is accountable for delivery of all projects in the NZTA portfolio.

A similar failing in the chain of accountability exists in the development phase of projects.



Note: Dark blue shading indicates the roles that have accountability for the preparation of business cases for projects

Figure 19: Vertical reporting line between Principal Transport Planner and Group General Manager, Transport Services

Principal Transport Planners are accountable for the preparation of business cases. They currently report to a Practice Lead – Transport Planning, who is not accountable for the preparation of business cases being led by the Principal Transport Planners reporting to them. The Practice Lead - Transport Planning reports to the Manager Transport Planning, who reports to the Senior Manager Planning, Performance and Safety. The Senior Manager Planning, Performance and Safety reports to the National Manager System Design. The review was not presented with any evidence that the National Manager System Design is accountable for the development of projects or the business cases being delivered nationally.

Principal Transport Planners also have a soft reporting line to a Regional Manager System Design, who is also the Project Sponsor during this phase of the project lifecycle. The Project Sponsor is accountable for project governance and oversight, but is not accountable for development of projects or the preparation of the business cases being prepared by Principal Transport Planners reporting to them. The Regional Manager System Design reports to the National Manager System Design.

These arrangements are illustrated in Figure 19.

Under these arrangements NZTA does not have a chain of accountability which extends from the Principal Transport Planner (accountable for an individual project) up to the Group General Manager, Transport Services (accountable for the whole portfolio).

NZTA interviewees also indicated that there is a lack of clarity on individual responsibilities and accountabilities for project delivery.

There should be a clear chain of accountability which extends from the Project Director up to the Group General Manager, Transport Services for Project Delivery, and from the Principal Transport Planner up to the Group General Manager, Transport Services for business case preparation, through intermediate levels that also have accountability.

NZTA's ability to drive performance through all levels of the agency and hold individuals to account for poor performance will be limited without clear chains of accountability.

Recommendation

✓ **R1.3 Ensure that there is an uninterrupted project accountability chain ("solid line") from the Project Director up to the Group General Manager, Transport Services for Project Delivery, and from the Principal Transport Planner up to the Group General Manager, Transport Services for business case preparation.**

4.1.3 Roles of the new governance groups

Key Finding

→ **F1.4 The roles of the new governance groups are unclear**

A new Regional Portfolio Governance Group and a new National Portfolio Governance Group are being introduced as part of the P3M implementation that commenced on 16 September 2024.

The roles of these governance groups are unclear, particularly in relation to how they support and advise delegated decision makers within the organisation.

NZTA interviewees also indicated that there is a lack of clarity on the roles of these governance groups.

In our view these governance groups should be viewed as internal stakeholder clearing houses that provide input prior to the accountable decision maker exercising their delegation.

Recommendation

✓ **R1.4 Governance groups for projects should be viewed as internal stakeholder clearing houses that provide input to decisions prior to the accountable decision maker exercising their delegation.**

4.1.4 Portfolio performance benchmarking

Key Finding

→ **F1.5 NZTA undertakes limited, routine portfolio performance benchmarking internally or externally, on time, cost, and other measures.**

NZTA prepares quarterly Portfolio Performance Reports for the Transport Services Group Leadership Team (GLT). These reports show progress against the Transport Services Portfolio Plan and cover all Transport Services programmes and projects. They provide portfolio level reporting in key areas including outcomes, financial, schedule, resourcing and risks.

NZTA also prepares monthly Operational Measures Reports. These reports document performance against a broad range of metrics including operations (e.g. public transport boardings), maintenance (e.g. pothole response time), capital project development (e.g. business case approval timelines) and capital project delivery (critical project milestones delivered on time).

These reports provided limited benchmarking in key capital project delivery metrics that we consider important. In our view, added benefit would be obtained by reporting and benchmarking additional metrics, as documented in the Project Reporting and Performance Measures section of the Effective Delivery Framework Assessment, which has been provided to NZTA separately. These metrics are categorised as:

- annual outcomes reporting;
- quarterly portfolio performance reporting; and
- quarterly input reporting.

The Effective Delivery Framework Assessment identifies metrics that should be reported to the GLT and the Board.

Further benefit could be obtained by benchmarking the annual outcomes reporting metrics and quarterly input reporting metrics against Peer Agencies on a periodic basis. NZTA could request that Austroads investigate the collection of these metrics from its member agencies for shared benchmarking purposes.

Recommendation

✓ **R1.5 Develop a set of portfolio and project performance measures that are regularly measured internally, and where possible externally benchmarked.** These measures should be reported to the NZTA Executive Team on a regular basis and to the Board on a selected basis.

4.2 Lack of in-house capacity and / or capability

4.2.1 Size of client teams

Key Findings

→ **F2.1 Client teams on projects are much smaller than Peer Agencies –** often only one to three NZTA personnel to lead and manage external service providers.

→ **F2.2 NZTA aims to be an informed and involved client, but due to client team size and capability limitations is not fulfilling this intention.**

→ **F2.3 Maintaining small project teams has reduced operating costs, however this has likely been at the expense of disproportionately higher project outturn costs.**

Size of NZTA client teams

NZTA's client-side delivery teams are considerably smaller than equivalent teams in Peer Agencies. More than half of the Benchmark Projects were found to have client-side delivery teams of no more than three

people. These projects ranged from approximately $100M to $2Bn in value. In one case, an approximately $1Bn project was staffed with one NZTA employee. In another case a $1.8Bn project was staffed with two NZTA employees.

Some NZTA interviewees stated that small client teams are necessary because of a lack of resources.

Comparable Peer Agencies' projects have significantly larger client-side delivery teams. Figure 20 below compares the size of NZTA client teams with those on known comparable Peer Agencies' projects. The trend line shows the typical growth in Peer Agencies' client teams as project value (and probably also complexity) increases. There is no corresponding correlation between project value and the size of NZTA's client-side teams.

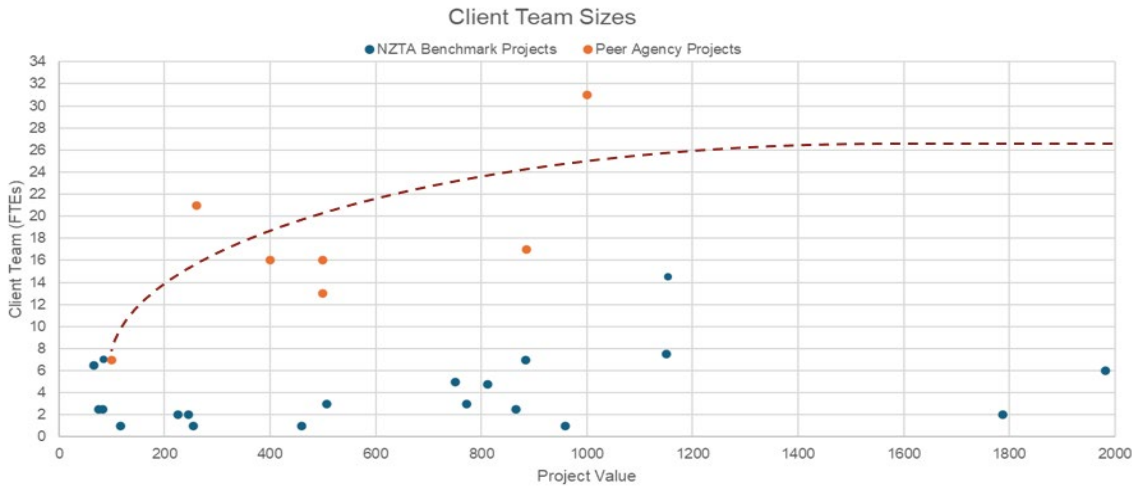


Figure 20: Client team size for projects at NZTA and Peer Agencies

Table 2 compares the client-side delivery team on a NZTA project with a similar Peer Agency project. The projects are both approximately $500M D&C urban road projects.

Table 2: Case study comparing client team size on an urban road project

Project	Peka Peka to Otaki Expressway	Confidential Project
Agency	NZTA	Australian Peer Agency
Project type	Urban road project	Urban road project
Cost	NZ$478M	NZ$550M
Contract type	D&C	D&C
Client team size	3 Full time equivalent roles	12 Full time equivalent roles
Client team roles	**Full time roles** • Principal Project Manager • Senior Project Manager • Graduate	**Full time roles** • Senior Project Manager • Project Support Officer • Commercial Manager • Project Contract Manager • 2 x Project Support Engineers • 3 x Surveillance Officers **Part-time roles (0.5 Full time equivalent roles each)** • Director Programme Management

Project	Peka Peka to Otaki Expressway	Confidential Project
		• Project Manager • 1 x Project Support Engineer • Community Representative • WHS Representative • Environmental Representative

Informed and involved client

NZTA interviewees generally stated that NZTA aims to be an informed and involved client. However, the small size of NZTA's client-side delivery teams reduces the agency's ability to be either fully informed or involved. Small team size limits NZTA's ability to:

- control and provide oversight of projects;
- dedicate time to effectively manage NZTA risks and issues;
- make timely and appropriate decisions; and
- effectively communicate and reinforce NZTA's expectations and requirements to external service providers.

This detrimentally impacts overall project performance, including time and cost outcomes.

False economy

In the past, governments in New Zealand and some Australian jurisdictions have used a decreased head count and reduced staff labour costs as measures of improved efficiency. However, we are of the opinion that using appropriately sized teams and improving the effectiveness of these teams will yield significantly greater savings in project outturn costs, than reducing the head count of internal resources will yield in savings in NZTA operating costs.

The trend to downsizing delivery agencies has reversed in recent years in some Australian jurisdictions.

In our opinion, increasing the size and capability of client-side delivery teams will allow NZTA to be a more informed and involved client, and be better equipped to effectively manage external service providers and project risks, resulting in improved value for money outcomes.

The optimal size of the client-side delivery team will depend on the scale, complexity and risk profile of the project, and the contract model. The process of determining the optimal size client-side delivery team should include benchmarking against similar, projects in Australian jurisdictions. Over time, NZTA will also be able to benchmark against client side delivery teams on its own projects.

It is noted that NZTA has prepared:

- a business case for the Roads of National Significance programme (RONS) resourcing requirements that acknowledges NZTA's historic use of lean client-side teams and some of the risks inherent in this approach. It proposes a resourcing model for RONS that provides stronger client-side project teams; and
- an End to End (E2E) Resource Model to support the identification of client-side project resource requirements in project development and delivery.

The appropriateness of the approaches contained within these documents was outside the scope of the Review.

Recommendation

✓ **R2.1: Increase the size and capability of client-side delivery teams** to improve NZTA's ability to act as an informed and involved client; better manage project complexity and risks; drive higher performance through technical leadership and interrogation of external service providers, and so drive better value for money outcomes.

4.2.2 Long term resource planning

Key Findings

→ **F2.4 NZTA does not have a long-term resource plan to meet and deliver the increased future pipeline of work.**

→ **F2.5 NZTA lacks a long term systematic training programme to build internal capability.**

→ **F2.6 There is likely to be a shortage of resources in New Zealand in some professional disciplines.** This will impact NZTA's ability to grow internal teams for the delivery of the increasing project pipeline.

Long term resource plan

Significant increases in internal capacity and capability will be required to deliver the expected increase in the project pipeline over the next ten years. The increases in internal capacity and capability are likely to require a combination of high levels of recruitment, the ongoing development of NZTA personnel, and industry secondments.

Increasing internal capacity and capability in line with the growing project pipeline is expected to pose a significant challenge to NZTA and is therefore considered a high risk to the efficient future delivery of the capital projects pipeline. NZTA does not currently have a long-term resource plan to meet and deliver the increased future pipeline of work.

NZTA needs to develop a strong understanding of the internal capacity and capability requirements to deliver the ten-year project pipeline, and then put in place a plan to meet these requirements. The plan should define the roles of both NZTA and external service providers now and in the future; identify short, medium and long term resource needs; and identify the initiatives that will be implemented to deliver on the resource needs. These initiatives will need to include a combination of recruitment, internal training and development, and secondment of external resources.

NZTA is not currently developing its internal resources through structured training and development programmes. NZTA interviewees stated that formal, structured training programmes existed in the agency five to ten years ago, including programmes to train and develop graduates in specific disciplines, and more generalist programmes relating to working in Government and the agency. These programmes no longer exist.

Interviewees also stated that NZTA ran a Project Management Academy initiative in recent years to provide training in project management. However, it is understood that this academy ceased to operate due to budgetary restraints.

NZTA should establish a structured, formal training programme to support the increasing internal capacity and capability needs. This programme should train participants in the NZTA ways of working and relevant key processes, and improve the competency of employees in their areas of expertise.

NZTA could consider short-term secondments or "exchanges" with Peer Agencies. Whilst these may be difficult to establish initially, we believe that they have the potential to provide significant value to NZTA.

They would provide NZTA personnel with hands-on experience of Peer Agencies' approaches to capital project delivery, and facilitate the exchange of ideas and learnings that would improve NZTA capital project delivery processes.

Industry-wide capacity constraints

There is likely to be a shortage of local professionals in some disciplines to deliver NZTA's increasing project pipeline. These disciplines include project management and cost estimating. This may prevent NZTA from locally recruiting the internal capability that it requires to deliver its future pipeline. As a result NZTA may need to seek resources from overseas.

NZTA should consider how it can foster the increase of the New Zealand resource pool where there are shortages of professionals in a specific disciplines, rather than focusing solely on NZTA's internal needs. It is in NZTA's interests to foster capability and capacity across the industry because when industry capability constraints exist, NZTA will pay more for scarce local resources.

Peer Agencies have faced similar challenges in the past. In response they have put in place programmes that built capability and capacity to deliver increasing capital project pipelines. For example, between 2015 and 2018, the NSW Roads and Maritime Services agency (now part of Transport for NSW) delivered various capability and capacity building initiatives as part of their "Wave" programme. These initiatives included:

- partnering with industry to second and procure contract staff in both specialist and administrative roles;
- attracting international contractors and more broadly engaging the contracting market through packaging and procurement initiatives; and
- developing industry skills including through the establishment of specialist skills training centres in both urban and regional areas (e.g. training hubs established under the NSW Government Infrastructure Skills Legacy Programme).

Some interviewees identified current NZTA initiatives to grow internal capability and capacity in response to the increase in the project pipeline. These include:

- the business case for RONS resourcing requirements which assessed the increased internal capability requirements arising from the uplift in the project pipeline due to the RONS programme under the 2024-27 NLTP. This identifies immediate and future recruitment requirements.
- the Transport Services two-year capability uplift plan that identifies a number of streams to increase its capability.
- other initiatives to increase internal capability and capacity in specific areas including commercial management, cost estimating and project management.

The appropriateness of these initiatives was outside the scope of the Review.

Recommendations

- ✓ **R2.2: Develop and implement a short, medium and long-term resource plan** to increase internal capacity and capability to deliver the increased pipeline of work. This should include **defining the role of NZTA versus the role of external service providers now and in the future.**
- ✓ **R2.3: Establish a structured, formal training programme** that covers both technical expertise and the NZTA ways of working and relevant key processes. This will improve the competency of employees in their area(s) of expertise and will also improve internal efficiency.

✓ Also refer to the improvement opportunities provided in the Systems, People and Innovation Enablers Review, Internal Capability and People, provided to NZTA separately.

4.2.3 Current capability gaps

Key Finding

→ **F2.7 There is currently insufficient internal capability and/or capacity in some disciplines** including cost estimating, project management, project controls, procurement and consenting.

NZTA interviewees identified immediate internal capability gaps in some key disciplines including cost estimating, project management, project controls, procurement and consenting. These internal capability gaps need to be addressed in the short term to support efficient delivery of current projects. It is likely that a mix of solutions will be required to address these gaps.

A variety of contingent labour sources should be considered to provide resources in the short term, whilst internal capacity and capability is built. These could include:

- professional services labour pools using panel or umbrella contracts covering both sole operators and smaller professional services firms, as well as the larger consultancies. Terms and conditions would be largely agreed through the panel or umbrella agreement, and individual resources would be provided through work orders.
- Delivery Partner arrangements whereby NZTA enters into an agreement with an external provider(s) to provide a relatively large number of resources to work collaboratively with NZTA's client teams to deliver defined services across multiple projects over an extended period. A delivery partner strategy must not be at the expense of reducing competitive tension during the procurement of downstream construction contracts.

NZTA is also undertaking a number of initiatives to address immediate capability and capacity constraints, including recruitment for the RONS programme. The appropriateness of these initiatives was outside the scope of the Review.

Recommendations

✓ **R2.4: Build internal capabilities and / or capacity to meet immediate needs** through a combination of recruitment and targeted training and development of existing NZTA staff.

✓ **R2.5: Develop a contingent labour strategy** including possible use of sole operators, professional service contractors and delivery partners to address short term deficiencies in NZTA capability and / or capacity.

4.3 Shortfalls in risk management and contingency

4.3.1 Risk management during project development

Key Findings

→ **F3.1 In the DBC and pre-implementation phases of projects, NZTA does not appear to tailor the investigation to address the project-specific risks** including the key risk areas of ground conditions, consenting and property.

→ **F3.2 Some NZTA projects have been awarded and commenced implementation prior to the mitigation of critical risks**, including consenting and property acquisition.

NZTA interviewees indicated that critical project specific risks are not being adequately identified, managed and mitigated during the DBC and pre-implementation phases. These risks include: ground conditions, underground utilities, property acquisition, consenting, design development and constructability.

The inadequate identification, management and mitigation of critical project risks is likely to be due to:

- appropriate subject matter experts not being involved, or adequately involved in risk management activities in the early phases of the project lifecycle; and
- inadequate investigations and project development (including design development) being undertaken to define, assess, manage and resolve the critical risk issues prior to contract award.

NZTA's process documentation, including the Project Management Guide (SM011) and the Risk Management Practice Guide (Z/44), do not provide detailed guidance on the level of investigations and project development (including design development) that should be undertaken during the DBC development and pre-implementation phases.

The lack of effective risk management during the business case and pre-implementation phases is resulting in:

- inadequate definition and quantification of risks during the business case, which is leading to inadequate risk contingencies and inadequate business case budget estimates;
- some projects being awarded and commencing implementation prior to the mitigation of critical risks, including consenting and property acquisition;
- overuse of alliances to deliver projects due to the high level of undefined risks at contract award; and
- cost overruns and delays when risks are realised during delivery.

In the past ten years, most Peer Agencies have increased their focus on risk identification and management during the development phases of projects, and increased the de-risking of projects prior to contract award. This has been driven by some high-profile projects that have suffered very significant cost overruns and delays due to poorly defined risks that were not adequately addressed prior to contract award (including ground condition, contamination, utilities, consenting, and property risks). Risks do not have to be resolved prior to contract award but they do need to be sufficiently well understood to allow appropriate risk allocation and risk pricing.

Risk management practices could be significantly improved during the DBC and pre-implementation phases by undertaking the following:

a) involving experienced designers, property team representatives, consenting team representatives, schedulers and subject matter experts in other critical pre-implementation and implementation risk areas, in all risk assessment processes used to identify, define and quantify risks;

b) increase investment during the business case and pre-implementation phases in technical development, investigations, early works and other measures that de-risk projects prior to award. This includes introducing guidance on the minimum levels of design development and investigations (e.g. geotechnical, utilities, and contamination as applicable) that should be undertaken to develop the technical solution during the preparation of the DBC and during the pre-implementation phase; and

c) as preferred practice, do not award a construction contract until: (a) consenting is completed and consent conditions are addressed in the contract; and (b) all property acquisition issues are understood such that land access will not become a basis of claim. Consenting and approvals risks can cause significant delay and increased costs, and the potential impacts to NZTA can increase considerably if a contract is awarded prior to these issues being resolved.

In relation to item (b), it is recommended that the level of engineering, design and investigations to be completed for the indicative business case (IBC) and DBC phases is specified in the Cost Estimating Manual as inputs to the stage of the cost estimate (with single stage business cases to be the equivalent of the DBC) as follows:

- the level of investment for the IBC phase should include as a minimum (for each option to be taken to DBC):
  - the development of a scoping design to 10% detail
  - desktop geotechnical and services studies
  - preliminary environmental studies to support consenting
  - desktop property assessment and valuation
- the level of investment for the DBC phase should include as a minimum:
  - the development of a definition design to 20% detail
  - field geotechnical and services studies, with appropriate intrusive investigations such as boreholes and test pits
  - detailed environmental studies with site work
  - detailed property assessment and valuation including individual site review of each property to be acquired

The measures in items (a) to (c) above will reduce the level of undefined project risk at award and the extent of cost and time overruns that will arise post-contract award if risks materialise. They will also facilitate the use of alternate contract models to alliances, which will support more competitive tender processes and better value for money outcomes on some projects (refer to section 5.3 for further details).

To the extent that risks have not been mitigated prior to contract award, project teams should allocate risks in physical works contracts based on a mutual understanding of the nature of the risks and the risk pricing within the contract sum, and include appropriate risk contingencies in implementation estimates and project budgets.

Recommendations

✓ **R3.1: Ensure experienced designers, property team representatives, consenting team representatives, schedulers and subject matter experts in other critical pre-implementation and implementation risk areas** (constructability, utilities, contamination etc.), **are involved in the risk**

assessment processes used to identify and quantify risks and to inform the calculation of the risk contingency.

- ✓ **R3.2: Increase investment during the detailed business case and pre-implementation phases** in technical development, investigations, early works or other measures **that de-risk projects prior to award.**
- ✓ **R3.3: As preferred practice, do not award a physical works contract until consenting is completed and consent conditions are addressed in the contract;** and all property acquisition issues are understood such that land access will not become a basis of claim.
  If it is essential that a physical works contract is awarded before consenting and property acquisition is complete (e.g. disaster recovery projects), a detailed understanding and quantification of the risks should precede contract award and the contract should include specific regimes for dealing with these uncertainties.

4.3.2 Contingency estimation and management

Key Findings

- → **F3.3 Contingency does not appear to be applied consistently in project estimates**, which are a mixture of P50, P80 and P95 cost outcomes.
- → **F3.4 There does not appear to be a consistent approach to contingency management** at the project or programme levels.
- → **F3.5 There was limited evidence of the use of Quantitative Risk Analysis (QRA) and no evidence of the use of Schedule Risk Analysis (SRA), for estimating or forecasting cost and risks** on the NZTA projects reviewed.
- → **F3.6 Underestimation of contingency is partly driven by insufficient understanding of project risks in the DBC and pre-implementation phases.**

Inconsistent contingency allowances

Benchmark Projects exhibited a wider range of contingency allowances at the DBC and contract award phase than Australian Peer Agencies' projects, including the inconsistent application of P50, P80 and P95 estimates. The average contingency allowed across the Benchmark Projects was 33% of construction costs at the DBC and 25% at contract award.

The Peer Agencies' projects consistently reported P90 contingency at the DBC and contract award phase. These projects had an average contingency allowance of 50% of construction costs at the DBC, which is considerably higher than the NZTA projects, and an average contingency allowance of 20% at contract award, which is slightly lower than the NZTA projects.

The difference between NZTA and Peer Agencies in DBC contingencies is significant. It suggests that NZTA may not be making adequate allowances for risk at this phase of the project lifecycle, particularly as NZTA projects appear to carry greater property and consenting risks beyond the DBC used for funding approvals.

The differences in contingencies between NZTA and Peer Agencies at contract award are not material. The slightly lower contingency percentage for Australian projects probably reflect a tendency to greater re-risking of projects prior to contract award in most Australian jurisdictions.

All Benchmark Projects were delivered under programmes, but only two of the 20 Benchmark Projects had evidence of programme-level contingency allowance in the project documentation reviewed. This suggests that programme level contingencies may not be commonly used.

Limited use of quantitative methods of risk analysis

The NZTA interviews indicated that only seven of the 20 Benchmark NZTA Projects applied QRA to determine the contingency allowance. Based on the requirements of the NZTA Cost Estimation Manual, QRA should have been carried out on all 20 projects.

Of the six Benchmark Projects subjected to NZ Treasury independent assurance review, only one applied QRA to determine the contingency allowance.

The use of QRAs for road infrastructure projects is generally standard practice in Peer Agencies.

NZTA Interviewees identified a range of deficiencies in contingency assessment including:

- inadequate contingency allowances in some DBC estimates due to limited understanding of critical project risks including consenting, property acquisition, design development, constructability and geotechnical conditions;
- when QRA was applied, there was overreliance on the QRA process, limited understanding of data inputs, and limited meaningful interrogation of the contingency estimate outputs;
- optimism bias; and
- a lack of consideration of risk-adjusted programme schedules (schedule risk analysis - SRA) in contingency allowances.

We believe that the deficiencies in contingency assessment may also be attributed to:

- a lack of suitably experienced technical experts being engaged in risk management activities at appropriate phases in the project lifecycle;
- an assumption that additional project funding would be made available later come what may; and
- a perception that appropriate risk valuation would “prevent the project from getting off the ground”.

Recommendations

✓ **R3.4: Update the cost estimating manual SM014** by:

- Considering alignment of the cost estimate manual to the AACE guidelines including the estimate classification and contingency benchmark guidance.
- Including detailed methods for the calculation of contingency using the general approach (deterministic) and the advanced QRA approach (probabilistic) outlined in SM014.
- Including a requirement for contingency to be calculated at consistent levels across all projects. Funding of contingency should be addressed within the project plan, with standalone projects funded at a P90 level, and programmes funded based on a contingency management plan and governance approach at a lower probability outcome level (but not as low as P50).
- Including a detailed method for the preparation of the risk adjusted programmes required by SM014 and the incorporation of the SRA findings in the cost estimate, risk and contingency calculation.

4.4 Limited independent assurance

Key Findings

→ **F4.1 NZTA does not have a rigorous independent investor assurance process with pre-defined gates (and requirements) at various phases of delivery**, similar to those used by Peer Agencies in Australia.

→ **F4.2 Interviewees stated that in some cases project estimates are being crafted to fit a pre-determined or announced budget figure.**

Independent assurance is undertaken on selected NZTA road projects by NZ Treasury under its own gateway assurance process. These projects are selected using NZ Treasury's Risk Profile Assessment. The NZ Treasury's Gateway assurance process is an independent peer-review process that examines investments at key points in their lifecycle to assess their progress and to rate the likelihood of successful delivery of their outcomes. Reviews are undertaken at the following project gates:

- Gateway Review 0: Strategic Assessment;
- Gateway Review 1: Business Justification and Options;
- Gateway Review 2: Delivery Strategy;
- Gateway Review 3: Investment Decision (prior to contract execution);
- Gateway Review 4: Readiness for Service; and
- Gateway Review 5: Benefits Realisation.

Reviews are undertaken by independent reviewers and facilitated by NZ Treasury.

The Review has not assessed the effectiveness of the Treasury Gateway assurance process. We do however note the limited application of QRA and SRA on Benchmark Projects that have been subject to NZ Treasury review (refer section 4.3.2).

NZTA has documented delegations for approvals / endorsements that must be obtained prior to projects proceeding to later phases of the project lifecycle. These delegations require project teams to obtain the following approvals and endorsements, generally from the National Manager Policy and System Planning or the Chief Financial Officer:

- endorse the Point of Entry for any project;
- approve proceeding with the development of any Strategic Case;
- endorse a Strategic Business Case;
- approve proceeding with the development of a Programme Business Case;
- endorse a Programme Business Case;
- endorse a Single Stage Business Case for a project; and
- approve funding for any phase of an activity.

These approvals are intended to provide a degree of internal investment assurance, and in particular verify the ongoing adequacy of the business case and provide next phase funding approvals.

In addition, NZTA also requires project teams to obtain VOS Committee approvals to proceed at the following phases of the project lifecycle (called 'readiness to proceed' reviews):

- record of Point of Entry;
- Programme Business Case and Next Phase approval;

- Project Business Case endorsement and approval; and
- Pre-Implementation endorsement and approval.

There are no detailed processes documented for the VOS Committee readiness to proceed reviews, and the reviews are not undertaken by independent reviewers.

Peer Agencies in most Australian jurisdictions have independent, gated assurance processes for large and /or high-risk capital projects. For smaller projects, within agency assurance reviews are generally conducted.

The scope of assurance reviews can be tailored to the project scale and risk profile, and generally include a review of: project scope, DBC, risk registers, cost plans, cost benefit analysis, procurement and delivery strategy, procurement documentation, and tender evaluation reports.

Effective independent assurance will:

- give early warning of issues, prior to progression to the next gate;
- create accountability for implementation of policies and processes;
- provide an opinion on whether estimates to deliver the defined scope are robust and account for all issues including contingency and escalation;
- make the system less reliant on individual Project Directors; and
- give confidence to the Board and Government.

Interviewees stated that in some cases project estimates are being crafted to fit a pre-determined or announced figure. This will result in inadequate estimates, with insufficient contingency, leading to future cost overruns. Independent assurance will reduce the likelihood of this occurring.

Recommendations

- ✓ **R4.1 Establish a structured, independent (of NZTA personnel), gated project assurance process for projects that are greater than $100M in value (i.e. high value) or classified as high risk**, which assesses the readiness of projects to proceed to the next phase in the project lifecycle, and the likelihood of them successfully delivering the required objectives (including consideration of scope and budget). The assurance process should verify that project phase deliverables are of an appropriate standard at each project gate.
- ✓ **R4.2 Introduce a 'light', independent (of project team), gated project assurance process for projects less than $100M in value or classified as low risk**, that requires a lower level of assurance activities commensurate with project size and risk profile.
- ✓ **R4.3 Ensure that assurance reviews prior to investment decisions specifically provide an opinion on whether the budget estimate to deliver the defined scope is robust and accounts for all issues including risk contingency and escalation.**

5 Priority 2 – Essential elements to effective capital projects delivery

The Review has identified six essential elements that are impacting NZTA's ability to efficiently and effectively deliver its capital projects. Addressing these issues will result in significant improvements in NZTA's performance in capital projects delivery.

These essential elements are:

- increasing the certainty of the capital project pipeline;
- improving project definition in the DBC;
- optimising the delivery model for projects;
- shaping and growing the market;
- including escalation in cost estimates; and
- minimising post-business case budget adjustments.

5.1 Increasing the certainty of the capital project pipeline

Key Findings

→ **F5.1 NZTA currently does not have a long-term transport plan that can support prioritisation of projects and expenditure.**

→ **F5.2 Both NZTA and industry (consultants, contractors) suffer from uncertainty about the future pipeline of work.**

→ **F5.3 Lack of certainty on prioritisation of projects may result in industry being unwilling to invest and commit additional resources.**

→ **F5.4 Projects are commonly reprioritised and delayed** by NZTA, and at the direction of Government through the GPS, **resulting in disruption of the workflow from DBC into implementation.**

→ **F5.5 Once reprioritised, projects are commonly rushed into delivery, resulting in the inability to undertake adequate investigations and early works as risk mitigation.** This often leads to an alliance being engaged for implementation as the default contract model.

NZTA has a National Land Transport Programme (NLTP) that provides a three-year, prioritised programme of land transport projects and activities with a ten-year forecast of revenue and expenditure. The short-term nature of the NLTP is inconsistent with the nature of road capital works projects, many of which have delivery horizons from "point of entry" to completion of construction of up to ten years.

NZTA has a State Highway Investment Proposal (SHIP) that documents the state highway activities that NZTA propose are prioritised within each Regional Land Transport Plan (RLTP) over the next ten years. This proposal does not however represent a prioritised programme that NZTA and the Government plan to deliver.

NZTA also has a 30-year plan (Arataki) which establishes a vision for the future land transport system and identifies issues that need to be resolved over the coming ten year period. However, this plan does not provide a prioritised programme of projects.

Beyond these planning documents, NZTA does not have a long term, prioritised pipeline of road capital works projects.

The short-term (3 year) nature of planning and funding driven by the NLTP, coupled with changing Government requirements, has resulted in a lack of certainty around NZTA's project pipeline. This is impacting the efficient delivery of projects due a number of factors including:

- projects stopping and restarting, often at the direction of Government and due to changes in the GPS, which reduces productivity and leads to re-work;
- restarting projects with tight timeframes can cause projects to enter the implementation phase with unresolved issues and higher levels of delivery risk, leading to delays and increased costs during construction;
- regular changes in the pipeline impact the efficient use of internal resources and the effectiveness of resource planning; and
- lack of long term certainty in the pipeline impacts industry's willingness to invest in the development of resources, capability, and innovative approaches. This is occurring at a time when NZTA needs the market to grow its capacity to deliver NZTA's increasing project pipeline.

A number of Peer Agencies prepare longer term project pipelines that are published and made available to the associated industry.

The public nature of these pipelines also improves pipeline certainty by providing political parties with a baseline that can be used to frame future transport commitments. Recent elections in NSW (2023) and Queensland (2024) have been characterised by the existing pipelines forming the basis of commitments made during campaigning, and then the incoming governments largely maintaining infrastructure pipelines developed by the previous governments.

The development of a 10-year prioritised pipeline of road capital works would provide greater pipeline certainty to both NZTA and industry. This would ideally be approved by Government and then be publicly released. Even if Government endorsement is not provided, it would be a valuable longer-term planning tool for both NZTA and industry. It is likely to reduce the number of projects stopping and starting following changes of Government; improve NZTA and industry's resource planning and management; improve the efficient use of internal NZTA and industry resources; and increase industry's willingness to invest in the development of resources, capability, and innovative approaches. It is also likely to make the industry more attractive to new entrants, including foreign contractors.

Recommendations

- ✓ **R5.1 Prepare a rolling 10-year, prioritised pipeline of road capital works projects**, updated periodically to reflect changes in Government priorities. This pipeline would prioritise projects in a similar manner to the current three-year NLTP.
- ✓ **R5.2 Seek Government approval of the 10-year, prioritised pipeline and its public release.**

5.2 Improving project definition in the detailed business case

5.2.1 Optioneering during business cases

Key Finding

→ **F6.1 High levels of optioneering appear to be undertaken in DBCs to exhaustively address issues that may arise during potential consenting court challenges**. It is unclear whether the consenting court risks warrant this level of optioneering.

There is a perception that NZTA is carrying out extensive optioneering in DBCs, beyond what is warranted for the consenting process, to "belt and brace" all options, not just the preferred options.

Benchmark Projects with exhaustive levels of optioneering in the DBC include:

- Te Ahu A Turanga – Manawatu Tararua Highway: assessed a final long list of 18 route options, which were developed without reference to mapped environmental features. The identification and mapping of environmental features occurred concurrently with the options assessment, rather than as a means of filtering the long list of route options; and
- Te Ara o Te Ata – Mt Messenger Bypass: assessed a long list of 24 options, with ability to gain consent as a key criterion of the multi-criteria analysis.

The extensive public consultation and consideration of feedback on a long list of route options means the route chosen may not align with the agency funding and objectives for the project. (e.g. the Te Ahu A Turanga – Manawatu Tararua Highway projects).

An NZTA interviewee noted that this practice may have been largely influenced by a precedent Environmental Court case (10 years ago), which provided a determination that options were inadequately assessed and justified.

The approach in Australian jurisdictions is more efficient. The IBC is used to assess options and identify a preferred option. Only occasionally is more than one option progressed to the DBC. The DBC and the associated environmental impact statement (EIS) or review of environmental factors (REF) (which include discussion of rejected options, and draft consent conditions) are then co-ordinated and focus on the preferred option. This ensures that the investment decision is based on a DBC for which project definition and scope, (draft) consenting conditions and property requirements are all co-ordinated. It is usual that final consent is received after DBC approval. The investment decision would only need to be revisited if there were material changes from the draft consent conditions to the final consent conditions.

The Review acknowledges that the New Zealand and Australian legislative environments are different.

Recommendation

✓ **R6.1 Review the risks associated with the consenting court challenges and the level of optioneering** being undertaken in DBCs, to verify that these risks are being appropriately managed and to minimise wasted optioneering effort.

✓ **R6.2 Ensure that business cases are used effectively to narrow the project options being considered.**

5.2.2 Risks and scope definition in business case

Key Findings

→ **F6.2 Project business cases do not adequately focus on the critical project specific issues** including technical requirements, property and consenting, **contributing to inadequate scope definition.**

→ **F6.3 A large number of scope changes occur after the completion of the DBC phase** of the project lifecycle leading to increased costs. This undermines the DBC approval as the critical investment milestone.

There is low confidence that NZTA projects and project benefits can be delivered within the DBC estimate due to the incomplete understanding and scoping of critical issues, including technical requirements, property and consenting.

This is evidenced by the types of scope change that occurred during the implementation of the Benchmark Projects, some of which may have been mitigated prior to implementation. Common scope changes, as directed by NZTA through construction contract variations during implementation included:

- design changes due to unforeseen latent conditions – e.g. Loop Road North to Smeatons Hill Safety Improvements Stage 2;
- upgraded pavement design standards (due to failures on a specific project) – e.g. Te Ahu a Turanga Manawatu Tararua Highway;
- additional scope requested by third parties – e.g. Auckland Northern Corridor Improvements; and
- active mode features, including shared user paths – e.g. Peka Peka to Otaki Expressway.

In some instances (e.g. the Queenstown Package) scope reductions were applied to stay within the project budget. We note that a client never recovers the appropriate valuation for scope reductions after contract award.

NZTA interviewees also noted that:

- relevant subject matter experts are not always engaged early enough in projects, in particular, the property and consenting teams, which can result in inadequate consideration of their critical issues, risks and activities in the DBC;
- a co-ordinated strategy for concept design development, consenting and property acquisition may not be fully developed on projects during the pre-implementation phase; and
- unexpected or onerous consenting conditions results in some projects needing to add scope during project delivery.

While Peer Agencies' projects also commonly experience some scope changes that result from technical and constructability issues, variations for property and consenting conditions (including addition of active transport) and scope reductions appear to be more prevalent across NZTA projects.

Improving scope definition in the DBC through more targeted investigations (such as technical studies and early community consultations for the preferred option) can significantly reduce the risks of costly changes during implementation. A well-defined scope can also help manage expectations and ensure better change management if risks are well understood, quantified and addressed with appropriate contingencies as early as possible in the project lifecycle.

Scope changes later in the project will inevitably impact project cost, time, and other outcomes, leading to the perception of poor investment decisions by NZTA if anticipated benefits in the DBC are not fully realised or are achieved at significantly higher costs.

Recommendation

- ✓ **R6.3 Ensure the DBC reflects an advanced understanding of critical project issues and risks for the preferred option,** including technical requirements and constraints, likely consenting conditions; and property requirements and acquisition timing. Increase investment in technical development and investigations to improve scope and risk definition.
- ✓ **R6.4 Ensure that the scope for the preferred option is well defined on completion of the DBC,** and that the scope risk is well understood, quantified and allowed for in the DBC estimate risk contingency.
- ✓ **R6.5 Revisit the investment decision prior to the appointment of a contractor if a material scope change occurs following the approval of the project business case** (including due to property and consenting decisions).

5.2.3 Unnecessary activities during business cases

Key Finding

- → **F6.4 Unnecessary activities are undertaken during the preparation of some business cases** due to teams adopting a standard, template-based process and / or an overly conservative, risk averse approach.

NZTA interviewees indicated that the preparation of some business cases included unnecessary activities due to a standardised templated-based approach that is not tailored to the project or programme characteristics. This has resulted in activities being undertaken that could have been reduced or omitted. Unnecessary activities have also been expended on some projects due to an overly conservative and risk-adverse approach, intended to provide stronger evidence and support for decisions.

The average cost of projects during the pre-implementation phase was 5% of the construction cost, which is higher than the Australian Peer Agencies. The additional cost incurred during this phase combined with less than the expected understanding of key risks and risk mitigations; indicates the focus of the expenditure may not be targeted appropriately.

The Review Team was provided with example DBC documents including for Melling Transport Improvements, Mt Messenger and Hairini Link projects. These were comprehensive DBC documents that included all the expected content. However, the Review Team felt that the DBCs did not focus on the key issues and risks that were realised on these projects. Examples of this can be seen in the Mt Messenger DBC, where key consenting and property issues were not appropriately mitigated during the pre-implementation phase.

We understand that NZTA is planning to introduce processes to better tailor business case development activities to projects and programmes, and better understand pre-implementation risks, as part of its Transforming Project Development initiative.

Recommendation

✓ **R6.6 Ensure project teams include a detailed and efficient business case work scope (not project scope) in the project plan for the preparation of the DBC**. The DBC preparation activities should be tailored to the project and the project characteristics (including size, complexity and critical risks).

5.3 Optimising the delivery model for projects

5.3.1 Selecting an optimal delivery model

Key Findings

→ **F7.1 NZTA's approach to developing the delivery and procurement strategy for projects** is not as robust as those adopted by Peer Agencies in Australia.

→ **F7.2 Peer Agencies use a broader range of contract models for road projects,** with a greater use of construct only and "design and construct" models.

Approach to developing the delivery and procurement strategy

NZTA's approach to the development of delivery and procurement strategies for projects is documented in the NZTA Procurement Manual and the SM021 Contract Procedures Manual.

The NZTA Procurement Manual is not tailored for infrastructure delivery. It provides generic guidance on all forms of procurement undertaken by the agency. SM021 Contract Procedures Manual provides very limited guidance on the selection of contract models for infrastructure delivery. It provides a Delivery Model Selection Diagram to support the selection of an appropriate contract model. This diagram combines project scale, complexity and risk into a single variable when identifying a preferred contract model. Each of these factors are critical to the selection of the appropriate contract model and should be considered independently.

The Stage 1 Procurement Strategy provided in Appendix XXVIII of the SM021 Contract Procedures Manual provides a template strategy and information on alternate contract models for infrastructure delivery, but does not provide clear guidance on the steps that must be undertaken to develop the optimal delivery model.

The various NZTA manuals also do not provide guidance on the selection of the optimal packaging strategy for a project.

Australian Peer Agencies provide a more robust and thorough process for the selection of delivery models for road infrastructure, where the delivery model comprises a design strategy, packaging strategy, contract model, and supplier selection method. They involve detailed and project specific assessments of each component of the delivery model, and are more likely to identify an optimal delivery model that is tailored to the project characteristics and the client's requirements. They are also more likely to identify packaging approaches that drive efficiency and are better aligned to the market.

The success of any delivery model selection process also relies on the involvement of experienced delivery professionals with a strong knowledge of the alternate delivery models.

Use of a broader range of contract models

Australian Peer Agencies generally use a much lower proportion of alliances (by value), and a higher proportion of construct only and design and construct contracts compared to NZTA (refer section 5.3.2).

They also use a broader range of contract models than NZTA. Models used by Australian Peer Agencies that are not considered in the NZTA manuals include:

- Hybrid or modified Design and Construct with tailored risk sharing mechanisms for critical risks;
- Incentivised Target Cost;
- Managing Contractor; and
- Delivery Partner.

Modified design and construct contracts with a tailored risk sharing mechanisms for critical risks have become particularly prevalent in one Australian Peer Agency. Under this mechanism a traditional design and construct model is amended to provide a more equitable allocation of critical risks that are difficult to quantify and price at tender. These risks may include utility owner approvals (including design certification), the extent of contamination remediation works, flood event impacts, and road occupancy licence (traffic) approvals. This mechanism allows critical risks to be treated using an alliance style approach, whilst delivering the bulk of the works as a competitively procured, fixed price, design and construct contract.

The implementation of a more robust, detailed and tailored approach to the selection of delivery models that is led by experienced delivery professionals with a strong knowledge of the alternate delivery models, and the consideration of a broader range of contract models, is likely to assist NZTA to select delivery models that are better suited to a project's characteristics and provide better value for money outcomes.

Recommendation

✓ **R7.1 Prepare a delivery model selection guideline that is specific to road infrastructure delivery.** The guideline should support the development of a delivery model tailored to the specific project that includes the optimal design strategy, packaging strategy, contract model and supplier selection method. The delivery model selection process should be led by experienced delivery professionals with a strong knowledge of the alternate delivery models.

✓ Refer to the opportunities to improve provided in the Systems, People and Innovation Enablers Review, Contract Models, which has been provided to NZTA separately.

5.3.2 High proportion of alliances

Key Finding

→ **F7.3 A higher proportion of NZTA's dollar value of works are being delivered under alliance contract models compared to Peer Agencies in Australia, and the majority of these are non-price competition alliances (pure alliances).**

NZTA's current use of the alliance contract model

Approximately 72% of NZTA projects by value are currently being delivery under alliance contracts. This is significantly higher than the proportion of alliance projects being delivered by Australian Peer Agencies. Australian Peer Agencies generally deliver most of their projects under fixed price, construct only and design and construct contracts.

A key factor in NZTA's selection of the alliance contract models is the extent of unresolved risks at contract award. Alliances are generally more effective than other contract models at delivering projects that have significant undefined risks at contract award, that are difficult to quantify and price, and which require a high degree of client / contractor interaction during implementation. The unresolved risks that exist on

NZTA alliance projects at award generally relate to consenting, property acquisition, under-developed design, constructability, and third party / other project interfaces.

Another factor that is likely to be contributing to the high proportion of alliance projects is the NZTA contract model selection guidance documents. The NZTA contract model selection guidance documents show a preference towards alliances not only for very large projects and very complex projects, but also smaller size and lower risk projects.

Most Australian Peer Agencies are much more restrictive in their use of alliances. Alliances are generally not the preferred model for very large projects and are not recommended for low risk projects. Peer Agencies usually limit the use of alliances to projects with delivery risks that cannot be mitigated, or defined and accurately priced prior to contract award. For example, projects with significant brownfields construction or unquantifiable ground condition risk that potentially alters design or construction methodology.

NZTA's preference for pure alliances (non-price competition alliances)

NZTA has a preference for non-price competition alliances (pure alliances) over price competition alliances. 70% of the alliances in the NZTA Benchmark Projects are non-price competition alliances. The non-price competition alliance procurement process selects the alliance partner(s) based on non-price criteria. The target outturn cost ("target price for the works") is subsequently prepared by the alliance partner(s) without competition.

Australian Peer Agencies generally prefer price competition alliances. 100% of the current road alliance projects for one of the Australian Peer Agencies are price competition alliances.

The Australian Government's "National Alliance Contracting Guidelines, Guide to Alliance Contracting"[13] also shows a strong preference towards price competition alliances, and states that any departure from a price competitive route *"…should only be agreed following a thorough analysis of the benefits afforded and when they can be clearly demonstrated"*.

Performance of NZTA alliance projects

NZTA alliance projects experience considerably greater cost overruns against DBC estimates compared to Australian alliances. NZTA alliance projects also experience higher cost overruns than NZTA D&C projects. This is inconsistent with Australia alliances, which generally experience lower cost overruns compared to D&C project.

When should alliances be used

Alliances can provide better value for money outcomes where delivery risks cannot be mitigated, defined and accurately priced by bidders prior to contract award (and which are not otherwise suitable for a modified Design and Construct approach, as discussed in section 5.3.1). However where delivery risks can be mitigated or defined and priced prior to contract award, alternate delivery models such as design and construct and construct only models with competitive procurement processes are likely to achieve better value for money outcomes.

Recommendation

✓ **Refer to recommendations R3.1, R3.2, R3.3, R7.1.**

[13] Australian Government, Department of Infrastructure and Regional Development, 2015, "National Alliance Contracting Guidelines – Guide to Alliance Contracting"

5.4 Shaping and growing the market

5.4.1 Broadening the contractor market

Key Findings

→ **F8.1 NZTA holds a dominant position for the development and delivery of transport projects in New Zealand; and correspondingly should drive the market to meet its objectives.**

→ **F8.2 The market appears to be resource constrained** with three to four key (Tier 1) contractors and five to six key multi-disciplinary service providers engaged on most projects.

→ **F8.3 There is a limited Tier 2 contractor pool independent of Tier 1 contractors who deliver small to medium size transport projects. Tier 1 contractors are currently filling this gap.**

→ **F8.4 The capacity of the contractor and consultant components of the New Zealand market will be strained by the impending growth in NZTA's pipeline** at a time of global over demand for resources, including throughout the Australian east coast.

→ **F8.5 As the ultimate client, it makes sense for NZTA to invest in increasing industry capacity, because it pays in terms of increased cost when capacity is exceeded.**

NZTA appears to have a strong reliance on a select group of key suppliers for the development and delivery of projects, as evidenced by the list of suppliers involved in the Benchmark Projects and summarised in Table 3.

Table 3 – Key suppliers on Benchmark Projects

Contractors	Service Providers
• Fulton Hogan – 11 projects • HEB Construction (Vinci) – 6 projects • Fletcher Construction – 5 projects • Downer Group – 4 projects	• Beca Group – 9 projects • Bond Construction Management – 8 projects • WSP (including WSP Opus) – 6 projects • Aurecon – 4 projects • Stantec – 4 projects • BBO – 4 projects • Alta Consulting – 3 projects

Market participation in construction tenders cannot be taken for granted in New Zealand due to the limited supplier pool, which does not have a strong three-tier system like Australia. The capacity of these suppliers will likely be further stretched by NZTA's growing pipeline, especially amid global resource constraints, including strong demand for resources on the Australian east coast.

There appears to be a gap in the market for Tier 2 construction contractors, which are contractors capable of delivering small to medium sized projects (in the range say $50M to $250M) but lack the sophistication of Tier 1 contractors particularly in the areas of design management and integration. They also tend to have less well-developed processes and systems.

NZTA as New Zealand's largest infrastructure developer and asset owner, can shape the market to support its corporate objectives. A healthy three-tier construction contractor market maximises competition, thereby encouraging innovation and improving productivity.

NZTA should focus on the development of a healthy Tier 2 construction contractor market over the medium to long term by:

- providing a pipeline of small to medium sized projects to be delivered through construct only contracts (up to approximately $150M); and
- requiring Tier 2 participation on selected projects. For example in two Australian Peer Agencies' jurisdictions, the Tier 2 market was encouraged by requiring Tier 1 contractors bidding projects to team up with a Tier 2/3 contractor to develop the latter's capability.

The growth in the project pipeline will strain consultant and contractor capacity, and this is likely to drive up the cost of increasingly scarce resources. As the ultimate client, it makes sense for NZTA to invest in increasing industry capacity, because it will pay higher costs when capacity is exceeded. NZTA should consider how it can increase industry capacity in line with the growing pipeline, including by supporting training that increases industry capacity in key workforce categories. NZTA should also train key service providers in critical NZTA processes that the service providers are required to follow during the delivery of their services.

Alternative delivery models may also help grow and shape the industry to meet NZTA's objectives. For example, delivery partner models have been adopted on recent Australian projects, including the Woolgoolga to Ballina Pacific Highway Upgrade and the Western Sydney Airport project. The delivery partner (a consortium of designers, constructors and project managers) is embedded in the client team to provide support across both professional services and construction work packages. The benefits of this delivery model include:

- increasing opportunities for all service providers and contractors to support the pipeline, regardless of tier;
- reducing uncertainty in industry capacity in a constrained market; and
- maximising innovation and efficiencies in project development and project delivery.

Recommendation

- ✓ **R8.1 Assess the long-term market structure that best serves the needs of NZTA and then actively develop procurement packaging and implementation strategy to encourage that market formation.**
- ✓ **R8.2 Develop a market that allows for delivery of a combination of large, medium and small projects by Tier 1, Tier 2 and Tier 3 contractors respectively as head contractor.** This is likely to include supporting the development of contractors from Tier 3 to Tier 2 in particular.
- ✓ **R8.3 Develop a long-term strategy to grow the Tier 2 contractor market** and increase the proportion of NZTA projects being delivered by Tier 2 contractors as head contractors. This may include using construct only contracts on smaller and less complex projects (up to approximately $150M), and tailoring procurement processes to support Tier 2 engagement.
- ✓ **R8.4 Consider a structured training programme to increase industry capacity in key workforce categories**, including through training schools and apprenticeships.
- ✓ **R8.5 Train key service providers in changes to NZTA's processes**, including changes arising from this Review. This should include training in the following critical areas: cost estimation; quantitative risk assessment and schedule risk assessment; risk identification, assessment and management; business case requirements; and project assurance. NZTA should subsequently monitor performance through active NZTA management and the PACE system.

5.4.2 Performance of key contractors

Key Finding

F8.6 There is a wide disparity in the performance of NZTA's Tier 1 contractors. Systemic poor performance by individual contractors across multiple projects is a significant concern, particularly given the relatively small Tier 1 contractor market.

NZTA interviewees suggested that there have been some challenging relationships with one of the key contractors on several Benchmark Projects.

NZTA should consider implementing more regular assessments and feedback to support underperforming contractors. Improving the performance of underperforming contractors is likely to lift the entire market and therefore create broader benefits.

Recommendation

- ✓ **R8.6 Use the NZTA PACE system to understand contractor performance across the NZTA portfolio, and to inform market engagement and future tender evaluation.**
- ✓ **R8.7 Ensure that NZTA proactively manages issues and potential impacts of contractors that have systemic performance issues.**

5.5 Including escalation in cost estimates

Key Finding

- → **F9.1 Escalation is not included in cost estimates** until funding requests are submitted, resulting in project costs being quoted/announced without escalation included and therefore always below outturn cost.

Most Benchmark Projects excluded escalation from the DBC estimates. This approach is consistent with the Cost Estimation Manual (SM014), which provides guidance for escalation to be applied for funding applications and long-term programming purposes, but excluded from any estimate used in economic analysis (such as the business case). As a result, project cost estimates will certainly be understated compared to the final outturn cost all other things being equal.

The issue with this approach is not whether it is theoretically correct, but more that the initial estimates have been used as the basis for the publicly announced project cost, which results in the agency immediately facing a shortfall in funding for the project. It also contributes to an undermining of public confidence in the effectiveness of project delivery by both Government and NZTA.

Accurate and reliable cost estimates drive cost certainty into the project lifecycle, and support project and programme budget setting and funding allocation.

Escalation should be included in all cost estimates. Without factoring in escalation, projects are at increased risk of budget shortfalls and potential delays due to funding issues.

We understand NZTA is in the process of updating the Cost Estimation Manual and has prepared the Escalation Annual Factors spreadsheet for the calculation of escalation. The appropriateness of this update was outside the scope of the Review.

Recommendation

✓ **R9.1 Update the cost estimating manual SM014 to require the inclusion of escalation in all estimates of the project outturn cost.**

5.6 Minimising post-business case budget adjustments

Key Findings

→ **F10.1 Post business case budget adjustments are greater than in Peer Agencies.**

→ **F10.2 Some scope and funding adjustments are submitted to VOS for approval after the costs have been incurred or committed to, which undermines internal client accountability.**

The NZTA Benchmark Projects demonstrated worse cost outcomes against initial project budgets than Australian Peer Agencies' projects:

- 11 of the 16 NZTA Benchmark Projects[14] required additional project funding, above the DBC P95 cost estimate. These projects averaged a 91% increase from the DBC P95 cost estimate to final forecast / outturn cost.
- In comparison, 6 of 10 Peer Agencies' projects (a similar proportion) required additional project funding, above the DBC P90 estimate. These projects averaged a 11% increase from the DBC P90 cost estimate to final outturn cost, which is substantially lower than the 91% noted above for Benchmark Projects.

NZTA interviewees also noted that some project funding requests and price level adjustments are submitted to the VOS committee for approval after the costs have been incurred.

Recommendation

✓ **R10.1 Ensure that scope and funding adjustment approvals are obtained prior to the corresponding costs being incurred or committed to.**

[14]Metric excludes projects without a detailed business case or those currently in the business case phase

6 Priority 3 – Improvement opportunities and enablers

The Review has identified six improvement opportunities and enablers. Addressing these will result in improvements in NZTA's performance in capital project delivery, but these issues are of a lower priority than those identified in sections 4 and 5.

These are:

- improving processes and systems;
- improving consultant performance;
- improving continuity and capability of NZTA personnel;
- increasing use of digital;
- providing pre-pipeline seed funding; and
- implementing a programme approach to disaster recovery.

6.1 Improving processes and systems

6.1.1 Key processes and their implementation

Key Findings

→ **F11.1 NZTA has detailed guidelines and procedures covering most of the key processes for the delivery of capital projects.** A significant number of processes are currently being updated.

→ **F11.2 Some capital delivery processes are not effectively implemented.** This impacts the efficiency of capital project delivery and contributes to time and cost overruns.

The Effective Delivery Framework (EDF) Assessment found that NZTA has detailed guidelines and procedures covering most of the key processes required for the effective delivery of capital projects. The quality of the processes and process documentation varied, and a number of the guidelines and procedures were being updated during the Review period.

Other process documentation needs to be updated to reflect changes in current practices, including changes arising from recent improvement initiatives (e.g. Transforming Project Development). There is no systematic approach to updating and maintaining NZTA process documentation.

NZTA interviewees indicated that there is significant variability in the implementation of some processes. Some individuals and teams apply the documented processes diligently, whilst others do not. There is no formal training of new employees on the NZTA guidelines and procedures.

The inconsistent implementation of processes is impacting the efficient delivery of projects, and at times contributes to time and cost overruns. Examples of processes that are not implemented consistently include QRA, SRA, and project reporting. The consistent implementation of NZTA processes, coupled with a structured, formal training programme (refer recommendation R2.3 in section 4.2.2) will improve the efficient delivery of capital projects.

The EDF Assessment identified a number of additional opportunities for improvement in key processes that are not contained in sections 4, 5 and 6. Refer to the Effective Delivery Framework Assessment that has been provided to NZTA separately for further details.

The review of Systems, People and Innovation enablers also identified additional improvement opportunities in key processes that are not contained in sections 4, 5 and 6. Refer to the Systems, People and Innovation Enablers Review that has been provided to NZTA separately for further details.

Recommendation

✓ **R11.1 Consider the improvement opportunities that have been identified in the Effective Delivery Framework (EDF) Assessment and the Systems, People and Innovation Enablers Review, that have been provided separately to NZTA.**
High priority recommendations identified in the EDF Assessment and enablers review, including recommendations related to governance, risk, cost estimation and contingency, assurance, and project pipeline, have been included separately in sections 4, 5 and 6.

6.1.2 Benefits realisation

Key Finding

→ **F11.3 There is very limited measurement of benefits realisation on projects.**

NZTA does not have a structured process in place for benefits realisation at portfolio, programme or project level. The SMO11 Project Management Guide does not include requirements to verify that benefits have been realised post-Implementation. The project management plan template includes a section on Benefits and Benefits Realisation Plan but does not provide any details on the purpose or contents of the Benefits Realisation Plan.

The NZTA Benefits Management Guidance website includes a section on Evaluating Benefits Realisation. This page indicates that post-Implementation benefits monitoring and reporting processes are under development.

Benefits realisation is an important element of capital project delivery as it verifies that the intended value and strategic objectives of the investment have been achieved.

Recommendation

✓ **R11.2 Develop and implement a standardised approach to benefits realisation assessment.**

6.2 Improving consultant performance

Key Findings

→ **F12.1 NZTA is a capital works delivery agency that is heavily reliant on outsourcing to third parties to deliver all critical inputs to a project.** This includes design, cost estimation, business cases, procurement of constructor, construction management and construction.

→ **F12.2 There is a lack of capability in professional services contract management** in some parts of the organisation.

NZTA's capital projects delivery is heavily reliant on outsourcing to third parties to deliver all critical inputs to a project. This includes design, cost estimation, business cases, procurement of constructor, construction management and construction. Australian Peer Agencies also outsource many of the critical inputs to a project, however Peer Agencies tend to have significantly greater in-house capability than NZTA (refer to section 4.2).

The high level of outsourcing makes it imperative that NZTA, as an involved and informed client, has a good knowledge of the services being delivered and strong consultant management capabilities.

A number of NZTA interviewees stated that there is a lack of capability in consultant management in some parts of the organisation. This may lead to:

- NZTA not receiving the full scope of contracted services to the required level of quality and within the required timeframes;
- NZTA being unduly influenced by consultants to undertake additional services due to the consultants' desire to expand their engagements; and
- NZTA undertaking additional activities due to consultants being too risk averse in the advice they provide.

Interviewees also stated that there are no formal training and development programmes to improve NZTA personnel's ability to manage consultants.

NZTA should ensure its client side teams take a rigorous approach to the management of consultant contracts, so that consultants deliver on all of their contract obligations. Consultant management should be improved through the provision of training and development in contract management and commercial acumen, supported by periodic auditing of service providers and an independent assurance process (refer section 4.4) to drive a focus on quality of service provider outputs.

Improved consultant performance should also be driven by the PACE system. The PACE system should collect and collate performance data on consultants, and this information should be used to inform future consultant procurement processes.

Increased competition will also drive improved performance. NZTA should use procurement approaches that utilise competition to drive improved offerings, and that encourage new entrants to the market. NZTA subject matter experts should support the procurement of consultants in their fields of expertise, by advising on consultants skills, experience and capability prior to consultants being engaged.

Recommendations

✓ **R12.1 Ensure that client side teams take a more rigorous approach to the management of consultant contracts, to provide certainty that consultant deliverables meet all contract obligations.**

- ✓ **R12.2 Ensure that consultant performance management frameworks such as the PACE system drive performance improvement and are considered in future consultant procurement processes.**
- ✓ **R12.3 Use outcomes focused procurement approaches that drive the engagement of high quality service providers** (including the use of in-house subject matter experts in the consultant procurement processes), as well as building market capability and capacity by providing paths for new entrants and smaller service providers.
- ✓ **R12.4 Improve the management of professional services providers** through the provision of training and development in contract management and commercial acumen; supported by periodic auditing of service providers and the use of an independent assurance process (refer section 4.4) to drive a focus on quality of service provider outputs.

6.3 Improving continuity and capability of key personnel

6.3.1 Changes in key leadership roles

Key Finding

→ **F13.1 Many projects have changed the responsible personnel multiple times.** In particular there is churn in the Principal Transport Planner and Project Director leadership roles, which destabilises the project team and undermines the successful delivery of projects.

A number of the Benchmark Projects had at least two changes of key leadership roles (Project Director or Principal Project Manager).

It is appropriate that key leadership roles change at defined times during the project lifecycle due to the need for different skillsets. This most commonly occurs during the transition from the development phase (when leadership in project development is needed) to pre-implementation / implementation (when leadership in construction management is needed). At other times continuity of leadership is critical to the stability and performance of the project team.

Changes in leadership can be highly disruptive, and can impact dynamics within the NZTA team and with suppliers. They can also result in inefficiencies and reduced productivity due to loss of project knowledge, and the learning curves that new personnel progress through to establish themselves in their roles.

Whilst some changes are inevitable, particularly as people leave the agency to pursue other opportunities, NZTA should seek to maintain continuity of leadership on projects whenever possible.

Recommendation

- ✓ **R13.1** To the maximum extent possible, **ensure personnel engaged in project leadership roles (Principal Transport Planner and Project Director) remain in these roles throughout the development and implementation phases respectively.**

6.3.2 Competency of Project Sponsors

Key Finding

→ **F13.2 The Regional Managers may not have appropriate competencies to perform the Project Sponsor role** under the new organisational structure currently being implemented.

The current implementation of the new P3M model in Transport Services includes the appointment of the existing Regional Managers as the Project Sponsors for the development and delivery of capital projects. As Project Sponsors, the Regional Managers will be accountable for project oversight and governance.

A number of NZTA interviewees raised concerns that the Regional Managers may not have the right skills and experience to effectively perform the Project Sponsor role.

The appointment of the existing Regional Managers did not consider their ability to perform this Project Sponsor role. Regional Managers may not have performed a similar Project Sponsor type role in the past. It is likely that some Regional Managers will not have the right skills and experience to effectively perform the Project Sponsor role.

Given the importance of the Project Sponsor role in the NZTA structure, it is critical that the Project Sponsors have the right skills, knowledge and support to be effective.

It is noted that NZTA is undertaking a number of initiatives to train and support the Project Sponsors. The appropriateness of these initiatives was outside the scope of the Review.

Recommendation

✓ **R13.2 Ensure that Project Sponsors have adequate skills, knowledge and support to perform their roles effectively**, including through the provision of targeted coaching where necessary. This recommendation should also be read in the context of the role of Project Sponsor as an internal client – refer recommendation R1.1 in section 4.1.1.

6.4 Increasing use of digital

Key Findings

→ **F14.1 NZTA's use of data and digitisation is not as mature as Peer Agencies.**

→ **F14.2 NZTA does not retain key project data in a suitable form that will contribute to (or create) a corporate "memory", and so support the agency benchmarking future projects to improve performance.**

NZTA interviewees identified a range of issues associated with the use of digital to support capital project delivery. The main issues identified were:

- NZTA does not have an effective approach to the centralised storage of key project data in a form that allows the data to be efficiently obtained and used. This limits NZTA's ability to use data from past projects to support future project development, project delivery and benchmarking;
- some digital process tools used to manage capital project delivery are inefficient. The most common concern raised by interviewees was the suitability of the project reporting tools, and the inefficiencies arising from the interfaces between the Planview, SAP and TIO systems;

- standardised digital engineering data is not being obtained from consultants designing and contractors constructing road assets. This limits NZTA's ability to use digital engineering data to support more effective asset maintenance and operations, and input to the design of future asset enhancements; and
- roadside technology equipment is not standardised. This has resulted in past projects delivering a mix of different roadside technology equipment and systems, which introduces challenges to the effective operation, maintenance and replacement of this equipment.

Based on the issues identified above, it is considered that NZTA's use of digital for capital project delivery is not as mature as Australian peer agencies.

The NZTA interviewees raised broad concerns with the lack of centralised data storage, and the challenges obtaining and using reliable data. Individuals, project teams, business units and various digital systems collate and store data separately, and it can be difficult and time consuming to obtain reliable data from past capital projects. This was evident during the Review when requests for project data were unfulfilled or only partially fulfilled.

Retention of data from completed and in-delivery projects in centralised and accessible locations, can bring significant benefits across the project delivery lifecycle. These include benefits arising from the use of the data to: support improved analysis and decision making; track historical performance trends and identify systemic issues; establish performance metrics and targets; inform risk assessments on future projects; improve cost estimates; and investigate and analyse past activities to capture lessons learned and potential improvements.

It is noted that NZTA is either considering or undertaking a number of initiatives to improve the use of digital in capital project delivery. These include:

- setting up a methodology that will require consultants and contractors to provide standardised digital engineering data for all future capital projects, and establishing a common data environment for the storage of this data; and
- updating its standards to provide improved consistency and integration of roadside technology equipment.

The appropriateness of these initiatives was outside the scope of the Review.

Further details on the use of digital is provided in the Systems, People and Innovation Enablers Review, which has been provided to NZTA separately.

Recommendations

- ✓ **R14.1 Develop a database of key project data** for completed and in-delivery projects, including cost and time data, that can be used to establish benchmarks and inform future estimation and project risk assessments.
- ✓ **Refer to the opportunities to improve provided in the Systems, People and Innovation Enablers Review, which has been provided to NZTA separately**

6.5 Providing pre-pipeline seed funding

Key Finding

→ **F15.1 NZTA is unable to undertake initial work on projects to provide high-level, initial justification for inclusion in a project pipeline because very limited funding is available prior to the Phase 1 Point of Entry in the project lifecycle.**

NZTA interviewees indicated that there is very limited funding available for projects prior to them entering Phase 1 Point of Entry in the project lifecycle. As a result, NZTA has limited opportunity to screen potential projects for their inclusion in a project pipeline by undertaking initial work to provide high-level, initial justification.

This may result in projects being added to the pipeline and potentially entering Phase 1 Point of Entry, that have not been adequately defined, costed at a high level and screened. Projects that enter a Phase 1 Point of Entry have a tendency to "stick", not least of all when public announcements are made prior to any high-level, initial justification.

In our view sufficient work should be undertaken on projects prior to them being added to the project pipeline to determine a high-level project budget. This work is likely to include: defining the network objectives; outlining the likely scope and budget; identifying potential land requirements; and understanding any unusual, critical project specific risks (e.g. environmental sensitive land, difficult ground conditions etc).

This could be achieved by establishing a pre-Point of Entry fund to allow this work to be undertaken. Projects that are subsequently added to the pipeline and enter Phase 1 Point of Entry would capitalise these costs, and the pre-Point of Entry costs expended would be returned to the pre-Point of Entry fund. This would limit the level of recurrent funding after the pre-Point of Entry fund is initially established.

This issue was investigated by one of the Australian Peer Agencies a number of years ago, and a similar funding mechanism was established. This subsequently improved the agency's pipeline definition.

Recommendation

✓ **R15.1 Establish a pre-"Point of Entry" fund (say of $100M) to allow sufficient works (network objectives, scope, land, risks) to determine a high-level project budget for all potential projects.**

6.6 Implementing a programme approach to disaster recovery

Key Findings

→ **F16.1 Disaster recovery is a significant and recurring part of NZTA's portfolio,** representing about 10 to 20% of annual capital spend.

→ **F16.2 NZTA will in future deliver disaster recovery projects in accordance with the NZTA Recovery Playbook.**

A significant and recurring component of the NZTA portfolio is projects that have been generated through disasters. These include the Christchurch Earthquake (2011), Kaikoura Earthquake (2016), and Cyclone Gabrielle (2023). Unfortunately, disasters of this type are a regular occurrence in New Zealand, and as a result planning and readiness should be a focus for NZTA.

In the last year, NZTA has published the NZTA Recovery Playbook, which provides a significantly improved framework for the management of large-scale events and supporting the required recovery activities. Although this framework has not been tested through a disaster, it is likely to support the efforts of the agency to respond quickly and effectively to a disaster.

The Kaikoura Earthquake Recovery Project was rightly considered a significant success by the Government, delivering its objectives for less than the initial budget identified. However, the Review Team noted that the coordinated efforts and processes used to bring about an immediate event response deviated from standard NZTA procurement processes and project governance arrangements. A new alliance, comprising industry participants with relevant capacity and availability to respond, was quickly formed after the disaster, managing $1.2Bn in expenditure under the oversight of a single NZTA staff member in a remote location. The project went through significant scope changes with a number of component projects being removed from the scope and limited associated governance. Furthermore, there appeared to be very limited records readily available to NZTA in relation to the project.

As this style of project is a recurring and consistent part of the NZTA portfolio, it is worth considering setting up standing arrangements to support the recovery effort, including panel arrangements with agreed commercial terms. This will allow the response to be both implemented more effectively and achieve better value for money outcomes for the agency.

Recommendation

- ✓ **R16.1 Given the recurrent nature of disaster recovery projects and their significance in the NZTA portfolio, consider introducing standing arrangements and resources that support the response to disasters** efficiently and effectively, including (for example) allocation of key people in a standing recovery team structure; establishment of panels of contractors with agreed commercial terms; and development of principles for the scope of recovery projects.

Appendix Section

A Glossary

B Review methodology

Appendix A: Glossary

Term	Definition
Benchmark Projects	The 20 NZTA capital projects reviewed as part of the TICP Review
DBC	Detailed Business Case
EDF	Effective Delivery Framework. The Effective Delivery Framework has been provided to NZTA separately.
GLT	Transport Services Group Leadership Team
Government	The New Zealand Government
GPS	The Government Policy Statement on land transport
IBC	Indicative Business Case
Implementation	Activities undertaken during Phase 5 Implementation of NZTA's Project Lifecycle Terminology: • The phase of project whereby the project team undertakes the tender process, awards the physical works contract, administers the contract, and hands the completed asset to the maintenance and operations team
IQA	Investment Quality Assurance
LTMA	Land Transport Management Act
NLTF	The National Land Transport Fund
NLTP	National Land Transport Programme
NZTA	New Zealand Transport Agency Waka Kotahi ("the agency")
PACE system	Performance Assessment by Coordinated Evaluation system
Peer Agency	The following Australian state-based road agencies: • Transport for NSW • Department of Transport and Main Roads (Qld) • Department of Transport and Planning (Vic)
Pre-implementation	Activities undertaken during Phase 4 Pre-implementation Phase 4 of NZTA's Project Lifecycle Terminology: • The phase of project development whereby the project team develops the design to the point required to go to market, undertakes property acquisitions, undertakes consenting processes and obtain consents, and prepares construction tender documentation.
Project delivery	Activities generally undertaken following completion of the business case, including design finalisation, award of a physical works contract, construction, commissioning and handover.
Project development	Activities generally undertaken from Phase 1: Point of Entry up to the completion of the business case.

Term	Definition
P3M	Portfolio, Programme and Project Model
P50, P80, P90, P95	A value derived from a quantitative analysis, which has a percentage probability of not being exceeded (for example the P95 has a 95% probability of not being exceeded).
QRA	Quantitative Risk Assessment
RLTP	Regional Land Transport Plans
RTC	Regional Transport Committees
Review	The Transport Infrastructure Capital Projects (TICP) Review
Review Team	The team engaged by NZTA to conduct the TICP Review
RONS	Roads of National Significance
SME	Subject Matter Expert
SM011	NZTA Project Management Guide
SRA	Schedule Risk Analysis
TICP	Transport Infrastructure Capital Projects
TOC	Target Outturn Cost
VOS Committee	Values, Outcomes and Scope Committee
$	New Zealand dollars, unless noted otherwise

Appendix B: Review methodology

Overview of the Review methodology

The Review was structured into four key stages:

1) **Inception**: Develop the stakeholder list, initial inception workshops, interviews with NZTA personnel, and onboarding of Peer Agencies.
2) **Data collection and analysis**: Interviews, surveys, workshops, benchmarking or other field work.
3) **Ideation**: Targeted workshops to test findings, generate ideas and confirm prioritisation of recommendations.
4) **Reporting**: Preparation of the draft report and final report.

Refer to Figure 22 for inputs, activities, and outputs for each of the components.

Workstreams

The Review activities were organised into three key workstreams as detailed in Figure 21.

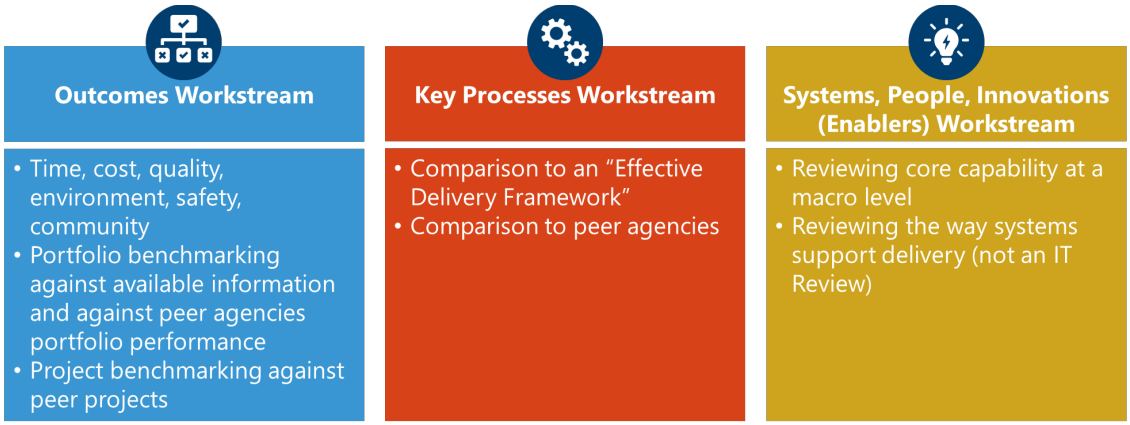


Figure 21: Overview of Review workstreams

Data used in the Review

The data supporting the analysis, findings and recommendations of the Review include the following:

- over 200 artefacts and process documents supplied by NZTA;
- NZTA Benchmark Projects documentation, including the DBC, contract data, project execution documentation, and status reports, supplied by the project teams;
- 27 interviews with NZTA subject matter experts;
- 20 interviews with project directors and/or project managers;
- interviews with NZTA Executive, NZTA Board members and Transport Services GLT members;
- inception workshops with 25 NZTA stakeholders in Auckland, Wellington and online;
- ideation workshops with 25 NZTA stakeholders in Auckland and Wellington;
- 4 industry/supplier interviews;
- interviews and material from the NZ Infrastructure Commission; and
- Peer Agencies and public industry data and benchmarks.

Peer Agencies

Peer Agencies were identified during the first week of the review and contacted by both NZTA and the Review Team. A commitment was made by NZTA and the Review Team that all information provided by Peer Agencies would be treated as confidential and non-attributable (by either project name or agency).

The initial responses from Peer Agencies were positive, including their participation in initial meetings and interviews. However some agencies were subsequently unable to participate due to the short timeframe and an inability to provide the required data.

The Review Team complemented the information provided by the participating Peer Agencies with publicly available data, and anonymised data from E3 Advisory's project database.

	Inception	Data collection and analysis (Outcomes, Key processes, Enablers workstreams)		Ideation	Reporting
Inputs	**Inception workshops with 25 NZTA stakeholders** in Auckland, Wellington and online	✓ **>200 Artefacts and process documents** supplied by NZTA ✓ **Data and documents for 20 projects:** • Business case, • Contract data, • Project Execution / Project Management plans • Status reports	✓ **27 interviews with NZTA subject matter experts** ✓ **20 interviews with Project Directors** ✓ **4 industry/supplier interviews** ✓ **Interviews and material from NZ Infrastructure Commission** ✓ **Use of peer agency & industry data and benchmarks** including major Australian state transport agencies	**Ideation workshops with 25 NZTA stakeholders** in Auckland and Wellington	**6 senior Australian transport industry experts** as reviewers and peer reviewers
Activities	• Develop stakeholder list • Conduct interviews and host inception workshops • Collate review documents • Interview senior leadership and key board members • Onboard relevant peer agency and industry partners	**Outcomes** • Internal benchmarking for cost/time/quality • Project benchmarking against Peer Agency projects • Portfolio benchmarking against available information and Peer Agencies' portfolio performance • Conduct Project Director Interviews • Data collation and analysis • Obtain and review Peer Agency input	**Processes and Enablers** • Review of key documents and artefacts • Conduct Subject Matter Expert interviews • Reviewing core capability at a macro level • Reviewing the way systems support delivery • Comparative analysis of NZTA key processes against Effective Delivery Framework • Investigate and define key Enabler issues • Comparative analysis against peer agency approaches	• Develop initial findings and recommendations • Stakeholder feedback on key issues in ideation workshops from select senior NZTA leaders and subject matter experts • Finalise key findings and recommendations	• Develop draft and final report • Presentation of final outputs to NZTA Board • Submission of report to Chair of NZTA Board
Outputs		• Project assessment and benchmarking (cost, time, quality) (Appendix H) • Identify key findings and recommendations • Analysis of capital delivery process and assessment against "Effective Delivery Framework" (Appendix B) • Analysis of enablers (digital, people, contract models etc.) (Appendix C)		• Key findings and recommendations	• Final report • Board presentation

Figure 22: Overview of Review methodology

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