Assessing infrastructure investments

Developing an Assessment Framework for New Zealand's Infrastructure Priority List

Part 2 report to Te Waihanga

Friday 25 August 2023

SENSE PARTNERS
DATA LOGIC ACTION

HADRON GROUP

Context

This report documents advice and options for implementing an Assessment Framework for New Zealand's Infrastructure Priority List (IPL).

The report was developed in partnership by Sense Partners and Hadron Group in collaboration with Te Waihanga. Rob Busch led the project for Hadron Group and Hannah Ouellet was the project lead for Sense Partners.

In this document we provide:

- Five international examples of assessment and prioritisation processes for infrastructure investments;
- Advice on the IPL's Assessment Stages, Processes, and Methodologies; and
- Advice on options for implementing an Assessment Framework given New Zealand's unique context, and insights from our other work during this project.

The Appendix includes separated screenshots of the full Assessment Processes and Methodologies.

How to cite this document

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Acknowledgements

We gratefully acknowledge the contributions of the Te Waihanga team and stakeholders who provided their time and valuable insights. This includes Waka Kotahi, Auckland Council, Meridian, the Ministry of Education and New Zealand Treasury.

Key insights and recommendations

Te Waihanga sought advice on developing an Assessment Framework for New Zealand's Infrastructure Priority List (IPL)

In May 2021, Te Waihanga released the New Zealand Infrastructure Strategy, *Rautaki Hanganga o Aotearoa* (*The Strategy*). Recommendation 40 in *The Strategy* suggests,

> "Establishing an independent IPL to build consensus on key projects and initiatives that address significant long-term problems".[1]

The Government is supportive of developing an IPL, and on 18 May 2023, the Government released its Infrastructure Action Plan, which states that Te Waihanga will work with Treasury to develop an IPL.[2]

Te Waihanga's first step in developing an IPL is to build an Assessment Framework to assess infrastructure proposals in the planning phase. This report outlines:

1. Five case studies summarising examples of international infrastructure proposal assessment and prioritisation processes,
2. Advice on IPL Assessment Stages and Processes,
3. Advice on IPL Assessment Methodologies,
4. Advice on how an IPL Assessment Framework can be applied in New Zealand's unique context,
5. Options to implement the Assessment Framework (from a minimum viable product to a do-maximum product), and
6. Resourcing implications per assessment.

We have worked closely with Te Waihanga at each step of the project to understand its existing thinking, test and refine our thinking, and to provide practical advice that will set up the IPL's Assessment Framework for success.

[1] https://media.umbraco.io/te-waihanga-30-year-strategy/mrtiklkv/rautaki-hanganga-o-aotearoa.pdf
[2] https://www.treasury.govt.nz/sites/default/files/2023-05/infrastructure-action-plan-2023.pdf

Insights from the international case studies

Task summary

We identified and researched five international case studies to inform the design of the New Zealand IPL. The five case studies we selected are:

- Infrastructure Australia and the Infrastructure Australia Assessment Framework.
- Infrastructure NSW and the Infrastructure Investment Assurance Framework.
- World Bank and the Infrastructure Prioritization Framework.
- Chile and the Sistema Nacional de Inversiones.
- Korea and the Preliminary Feasibility Study.

For each case study, we collected information on their implementation and structure, core assessment approaches, relative strengths and limitations, and key takeaways for the New Zealand context.

Key insights from the international prioritisation and assessment processes are:

- Strategic alignment and value-for-money are core parts of each assessment approach, though the tools and methodologies to assess these vary.
- Assessment stages are typically aligned with key business case artefacts, which helps assessment approaches fit within existing systems.
- Sector-specific requirements are frequently used to account for the key differences between sectors (e.g., minimum standards, nature of impacts and benefits, level of competition/availability, etc.).
- Evaluation timing has a significant impact on the level of influence they can achieve but also the depth of information that is available for assessment.
- Different scoring approaches are used, including binary outcomes (e.g., yes/no), a multi-score system (e.g., green, orange, red 'traffic lights') and continuous scales (e.g., a calculated score between 0.5-1.0). Simpler binary and multi-score approaches are likely easier to communicate to key stakeholders.

Section 2 of this report details the approach and further insights from assessing the case studies. The case study summaries are provided at Appendix A.

Insights from the New Zealand Context

Task summary

We conducted a gap analysis between New Zealand's Investment Management System (IMS) and *The Infrastructure Strategy* to explore how the IPL's design could help fill gaps in the current system.

We also held stakeholder engagements with with Treasury, Ministry of Education (MoE), Waka Kotahi, Auckland Council, and Meridian to get a better understanding of how the IPL could be successfully applied in New Zealand's unique context.

We identified **nine key insights** and recommendations from our gap analysis and stakeholder engagement process. that have significant implications on the design of the IPL:

Key insights	Implications for the design of the Assessment Framework
Identified via gap analysis **and** stakeholder engagements	
Gap: Infrastructure needs require identification	• Te Waihanga should develop an appropriate evidence base to identify long-term infrastructure needs (possibly as a separate workstream) • Long-term needs should then undergo the same assessment process as all other early-stage projects. If successful, needs are then included on the IPL (noting that they need a proponent) • A detailed pathway for Aotearoa's infrastructure needs is developed
Identified via gap analysis	
Gap: Decision making should be transparent to the public	• Te Waihanga should publicly release information on infrastructure project assessments and how they were assessed • Use the Official Information Act 1982 as guidance where information should be withheld (e.g., commercially sensitive information, information that would decrease the negotiating power of the Government, legally privileged information etc). • Provide meaningful feedback to proponents, particularly if projects do not make the list (e.g., how can the project make the list, or let proponents know if the project is out of scope/not appropriate)
Gap: Make clear trade-offs across the infrastructure portfolio	• The Assessment Framework should be general enough to assess all types of infrastructure – even projects that would not typically be provided or funded by central government • Do not use "infrastructure sector" as a filter for assessments
Gap: Consider strategic alignment	• Create a bespoke process and methodology to assess the strategic alignment of proposals against the five objectives in *The Strategy*

Key insights	Implications for the design of the Assessment Framework
Gap: Enable flexibility to include technical guidance	• Build flexibility into the Assessment Framework so that over time it can be updated to accommodate new technical guidance and/or sector specific guidance • Ensure Te Waihanga has an opportunity to leverage experience and provide guidance (sector or methodology specific) where there are clear gaps and common weaknesses in proposals over time
Identified via stakeholder engagements	
Opportunity: Co-ordination is needed across sectors and agencies	• The Assessment Framework has a built-in mechanism that considers other relevant agency or sector strategies in project assessment • Te Waihanga should establish strong communication/feedback channels with proponents to connect organisations early in the development of cross sector/agency projects, and • The IPL could signal key project constraints in the publicised assessment summary (e.g., this project's benefits are constrained by land-use settings and a lack of water service capacity)
Opportunity: Assess infrastructure programmes as well as projects	• Programme Business Cases (PBCs) do not usually have detailed cost-benefit-analyses, schedules, financials or specific procurement information. However, PBCs can be supplemented with individual Business Cases (for a project, or a tranche or projects) to assess programmes.[3] • Programmes could be assessed as a whole in the early stage. This aligns with the high-level nature of the RPA, Strategic Assessment, and PBC documentation in New Zealand. Infrastructure Australia **only** publishes Programmes as a whole in Stage 1 (no project-level details - e.g., NSW social housing programme). • In subsequent stages, programmes could be assessed by individual business cases (for a project, or tranche of projects) and/or by Activity Management Plans, with individual projects published on the IPL under a wider programme heading.
Critical design feature: Minimise administrative burden	• Submission requirements are based on existing documentation and templates
Critical design feature: Integrate IPL into New Zealand's IMS	• Integrate the IPL into an existing process (e.g., Quarterly Investment Reporting) to quickly garner a critical mass of submissions/projects • Use New Zealand's Better Business Cases model as the starting point for the IPL assessment stages

[3] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/better-business-cases-bbc/programme-business-case

Recommendations on Stages and Processes

Task summary

We recommended a set of assessment stages and processes to achieve the objectives for the IPL based on our case study findings, our previous experience in the operation of infrastructure investment assessment processes and Te Waihanga's initial planning.

Our analysis of the New Zealand context enabled us to develop stages and processes that dock into the existing system, helping address current gaps while minimising overlap.

We developed our recommended stages in partnership with Te Waihanga, through multiple workshops and testing a range of stage and process options against a set of sample projects. These 12 sample projects were selected to cover a range of sectors, locations, costs, and project types (where business cases were publicly available).

We recommend a three-stage assessment process that aligns with the existing Better Business Cases stages:

- **Stage 1** assesses a Risk Profile Assessment / Strategic Assessment submission
- **Stage 2** assesses an Indicative/Programme Business Case submission
- **Stage 3** assesses a Detailed Business Case

This approach aligns most closely with Te Waihanga's objectives for the priority list. Stage 1 is critical to identifying longer-term infrastructure needs, while Stage 2 is where the priority list can most strongly influence project development and funding decisions, as well as provide transparency to the public on infrastructure decision making. A Stage 3 assessment will provide the government and the public high-quality advice and transparency on project funding decisions.

We recommend creating consistent processes in each assessment stage to have a framework that is easy to understand and implement. Our proposed high-level steps are shown below.

We have developed detailed process flow charts that follow this structure for each assessment stage. These are provided at Appendix B and described in Section 4 of this report.

Across each stage, we propose three assessment criteria:

- **Strategic alignment:** How does a proposal a proposal fit within and support future infrastructure priorities and the existing infrastructure systems and networks that are in place?
- **Value for money:** Does a proposal provides value to society over the costs required to deliver, operate, and maintain it?
- **Deliverability**: Can a proposal can be successfully implemented and operated over its life.

We recommend using deliverability for review in stages 1 and 2, not as a threshold for a successful assessment. Deliverability should be fully assessed at Stage 3 to ensure projects on the priority list at this stage are investment ready. This is further discussed in Section 4.4.2.

We recommend using a traffic light system for individual assessment criteria. The overall assessment outcome should be reflected in a proposal's inclusion (or not) on the priority list. Inclusion on the list would likely be based on a proposal not receiving any red ratings (apart from deliverability in stages 1 and 2). Alternative approaches and the strengths of this approach are discussed in Section 4.4.5 of this report.

The full report also provides detail on our recommendations for:

- the triage step,
- how to engage with proponents,
- seeking further information from proponents, and
- outputs of the assessment process.

Recommendations on the Strategic Alignment Tool

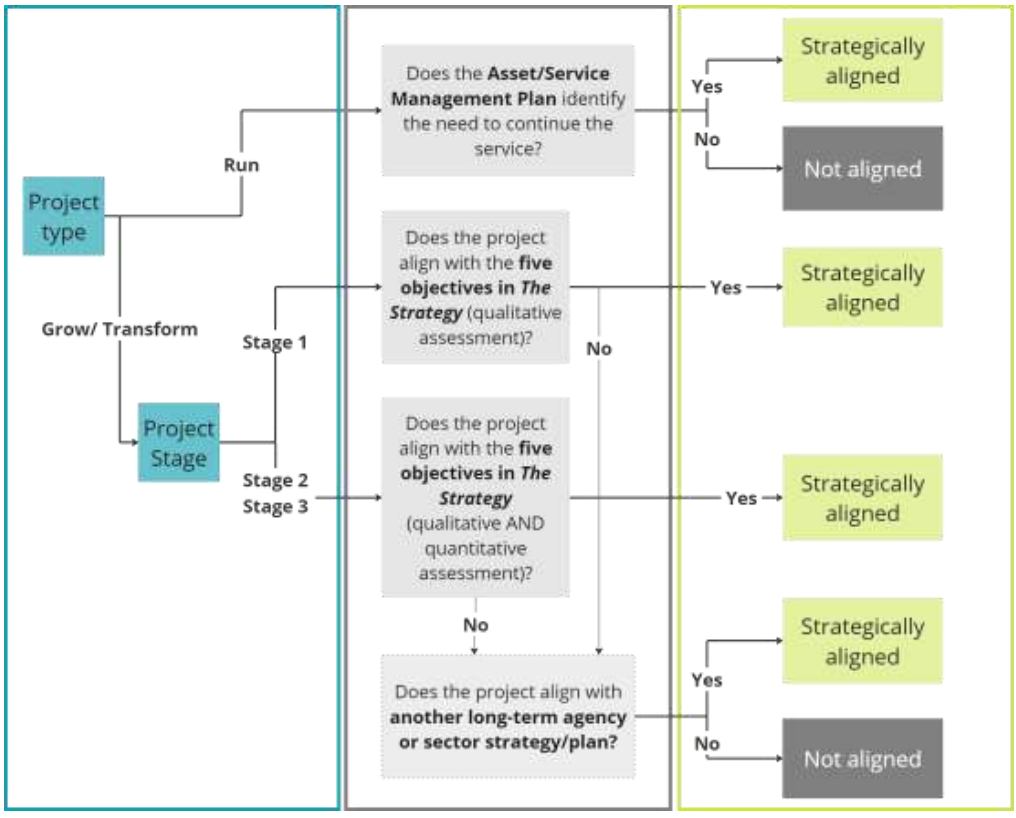
Task summary

In collaboration with Te Waihanga, we developed a Strategic Alignment Tool to assess if proposals align with *The Strategy's* five strategic objectives or with Asset/ Service Management Plans (AMPs). The Strategic Alignment Tool is informed by:

- *The Infrastructure Strategy*,
- other investment prioritisation processes in New Zealand (e.g., Waka Kotahi's Investment Prioritisation Method)
- information we can reasonably expect from proposals at each Stage (e.g., Risk Profile Assessments and Business Cases), and
- direction from Te Waihanga.

The Strategic Alignment Tool is a standalone product that can be applied across Stages 1, 2, and 3. It sits under the wider Strategic Alignment Process (see Section 4.4.2). Because the Tool is a standalone product, it has its own process with more detailed questions and metrics (assessment methodologies) sitting beneath it.

The figure below shows the high-level process for assessing strategic alignment with the tool.



There are four key components of the Strategic Alignment Tool:

1. **Sorting questions gates:** this allows for a fit for purpose assessment of proposals given project type (e.g., maintenance, renewal, expansion, or new) and project stage.
2. **Qualitative questions**: yes/no questions that test a project's strategic alignment with *The Strategy's* five objectives.
3. **Detailed/quantitative questions**: that provide a check and evidence-base for the preceding qualitative questions (for Stages 2 and 3 only).
4. **Opportunities for assessors to provide comments/ recommendations.**

We developed a detailed Strategic Alignment Tool flow chart that follows this structure in detail for each objective in *The Infrastructure Strategy*. These flow charts are provided in Appendix C and are described in Section 5 of this report.

For scoring, we recommend that Te Waihanga use a traffic light system that highlights when there are trade-offs between objectives. For Stage 1 assessments, projects are either "Aligned" or "Neutral" with each of the five objectives. In Stages 2 and 3, projects are either "Aligned", "Neutral" or "Actively Detracting" with each of the five objectives. The Tables below outline examples of how the traffic light system could work for the Strategic Alignment Tool.

Circumstance – Stage 1 Assessments	Rating
No meaningful contribution to any of the five objectives	Red rating
Meaningful contribution to one of the five objectives	Amber rating
Meaningful contribution to more than one of the five objectives	Green rating

Circumstance – Stage 2 and 3 Assessments	Rating
No meaningful contribution to any of the five objectives AND/OR Actively Detracts from more than one of the objectives	Red rating
Meaningful contribution to one or more of the five objectives AND one "Actively Detracts" rating	Amber rating (indicates trade-off)
Meaningful contribution to more than one of the five objectives (with no "Actively Detracts" ratings)	Green rating

The Strategy is unlikely to anticipate all possible infrastructure needs. So, the Strategic Alignment Tool needs to consider strategic objectives or needs identified by other strategy documents.

We recommend that Te Waihanga runs a separate process to evaluate other relevant sector/agency strategies. This register would allow assessors to reference a vetted register instead of searching for strategies/plans mentioned in submissions on an ad-hoc basis.

Insights from Value for Money Methodologies

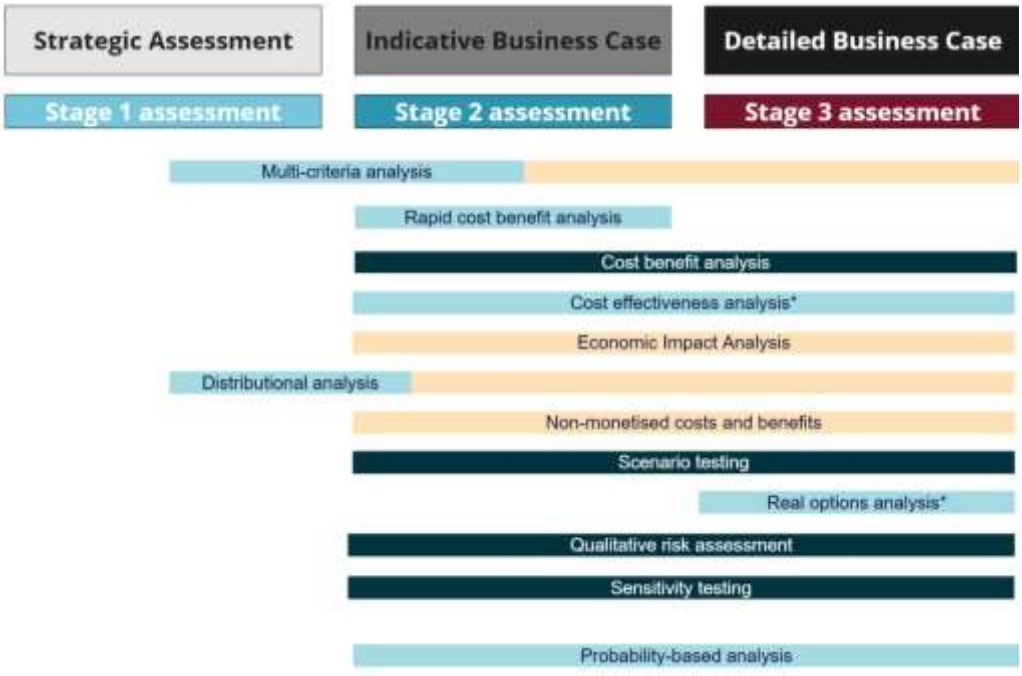
Task summary

We have developed a comprehensive register of 12 commonly used value for money, risk, and uncertainty methodologies used in project appraisals.

The figure below outlines a summary of when each methodology can or should be used. We have identified four methodologies that should be included in Stage 2 and Stage 3 proposals (with few exceptions) - these are standard approaches for assessing infrastructure projects.

The full register can be found in Appendix D. The register outlines a brief description of the methodologies; strengths and weaknesses of the methodologies; and the appropriate Stage(s) for using the methodologies.

Should use methodology	
Can use methodology	
Can use methodology **alongside** a more robust analysis	



*Cost effectiveness analysis can be used in limited cases in Stages 2 and 3 (see Section below). Real Options Analysis should be used in Stage 3 if Scenario Analysis highlights that uncertainties have a significant impact on investment outcomes.

Developing final Assessment Framework options

Task summary: Developing Options

We understand Te Waihanga will work with Treasury to explore options for the IPL's Assessment Framework. **We recommend taking these options forward as part of your collaboration with Treasury.** We have also provided advice on how Te Waihanga could develop final Assessment Framework options with Treasury, including by developing a joint register of "must have" and "nice to have" components of the IPL.

We developed four illustrative options for the Assessment Framework:

- **Option 1:** A minimum viable product
- **Option 2:** Pre-investment decision focus
- **Option 3:** Do-maximum product
- **Option 4:** Building capacity over time (staged)

These options are based on insights from the New Zealand context section and are informed by our work on the Assessment Stages, Processes, and Methodologies.

We also estimated the resourcing required per assessment at a given Stage to, which Te Waihanga can use to help show the costs and benefits of each option.

When developing the options, we recommend Te Waihanga define a register of "must have" and "nice to have" components of the IPL. The register should be informed by Te Waihanga's objectives for the IPL and key insights from the New Zealand context.

Options can be developed by grouping key components.

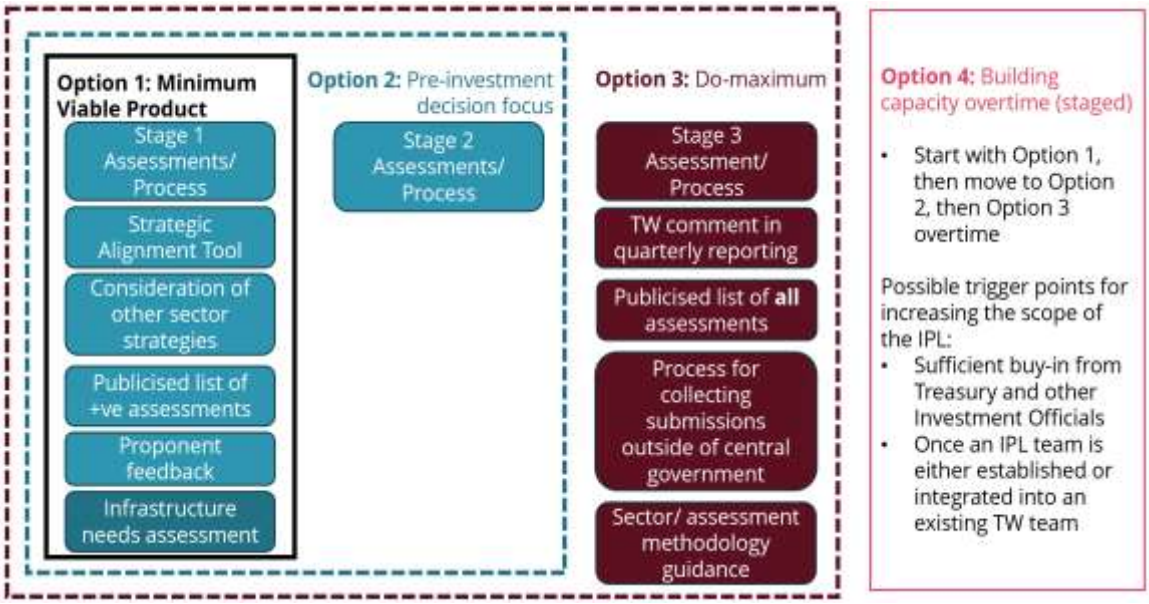
We believe that the minimum viable product option should be designed to satisfy the "must have" components, which represent the foundations of the IPL.

We recommend holding the foundations of the IPL fixed across all options, with further options designed by adding additional components to the Assessment Framework. This approach has the following benefits:

- **Staging:** Options are buildable and can be staged, allowing Te Waihanga to increase its capacity overtime
- **Speed:** Implementing a minimum viable product is faster than implementing a do-maximum option, allowing Te Waihanga to build critical mass on an IPL quickly.
- **Collaboration:** Te Waihanga is developing the IPL in collaboration with the Treasury. Building consensus on the IPL's foundational components, then expanding on that foundation to create new options, facilitates a more effective design process by enabling Treasury and Te Waihanga to identify exact points of disagreement.

The Figure below outlines options for the IPL's Assessment Framework. Option 2 builds on and is all inclusive of Option 1, and Option 3 builds on and is all inclusive of Option 2.

Option 4 highlights Te Waihanga could implement Option 1, the minimum viable product, then implement Options 2 and 3 over time as capacity builds. If a staged option is considered, we recommend clear expectations and milestones for increasing the scope of the IPL are established from the outset. For example, Te Waihanga could move between Option 1 and Option 2 when there is sufficient buy-in across stakeholders and when an IPL team is established at Te Waihanga.



Our analysis suggests that Te Waihanga needs 1.3 to 1.9 FTE to assess 88 to 132 proposals in one year. This assumes a mix of Stage 1, 2, and 3 proposals, with more Stage 1 proposals initially. These resources are for conducting assessments only. There are additional costs associated with other activities such as administration of receiving submissions.

	Number of Stage 1: Stage 2: Stage 3 submissions		
	Scenario 1: 110 total	**Scenario 2: 88 total**	**Scenario 3: 132 total**
	88: 11: 11	**70: 9: 9**	**106: 13: 13**
Total assessment FTE	1.6	1.3	1.9

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1. Context, objectives, and scope

1.1. Our brief

The New Zealand Infrastructure Commission (Te Waihanga) commissioned this report from Sense Partners and Hadron Group to receive advice on the Assessment Stages, Processes, and Methodologies that can be applied for a New Zealand Infrastructure Priority List (IPL).

We have developed our advice by leveraging our hands-on experience with assessing infrastructure proposals, developing assessment processes, and our strong understanding of the New Zealand context.

We have also worked closely with Te Waihanga at each step of the project to understand its existing thinking, test and refine our thinking, and to provide practical advice that will set up the Assessment Framework and the IPL for success.

On 19 July, we provided you with the Part 1 report, which outlined advice on the assessment stages, process, and methodologies. It included four deliverables:

- Deliverable 1: Five case studies summarising examples of overseas infrastructure proposal assessment and prioritisation processes,
- Deliverable 2: Advice on IPL Assessment Stages and Processes,
- Deliverable 3: Advice on IPL Assessment Methodologies, and
- New Zealand context: Gap analysis of New Zealand's existing Investment Management System (IMS).

This report covers Part 2 of the engagement and is an iteration and expansion of the Part 1 report. In addition to the four deliverables in Part 1, Part 2 includes:

- Further consideration of the New Zealand context: Insights from stakeholder engagements and Treasury's work programme on strengthening New Zealand's Investment Management system,
- Options: Advice on how Te Waihanga could develop options for implementing an Assessment Framework (informed by deliverables in Part 1), and
- Resourcing implications: High-level estimates of resourcing needed for different Assessment Framework options.

All recommendations in this report are explicitly stated. References to "Te Waihanga's guidance" to us, and/or their "internal feedback" to us do not represent organisation-adopted positions. Instead, these are directions we received from Te Waihanga's Economics team, with the understanding that the organisation's positions may change as the IPL develops.

Similarly, the IPL's Assessment Framework will evolve overtime to reach consensus within Te Waihanga, and to reflect feedback from the IPL's co-design lead (Treasury) and stakeholders. The IPL may also evolve in response to challenges and opportunities identified in its operation.

1.2. Background

1.2.1. Infrastructure Strategy

In May 2021, Te Waihanga released the New Zealand Infrastructure Strategy, *Rautaki Hanganga o Aotearoa* (*The Strategy*). *The Strategy* outlines the role infrastructure can have in supporting New Zealand's future and outlines 68 recommendations to improve the way we use, plan for, deliver, and maintain infrastructure.

Section 6 of *The Strategy,* "A thriving New Zealand: what we need to do" outlines five strategic objectives for Aotearoa's infrastructure system:

1. Enabling a net-zero carbon emissions Aotearoa
2. Supporting towns and regions to flourish
3. Building attractive and inclusive cities
4. Strengthening resilience to shocks and stresses
5. Moving to a circular economy

We have used these objectives to design a bespoke methodology for assessing whether a project aligns with *The Strategy*. We have also used the objectives to assess gaps in New Zealand's IMS in Section 3.2.

Section 7.1 of *The Strategy*, "Better Decision Making" summarises 10 core principles for infrastructure decision making and makes nine implementable recommendations. Alongside the five objectives, we have used these 10 principles to assess gaps in New Zealand's IMS in Section 3.2.

Infrastructure Priority List

Recommendation 40 in *The Strategy* suggests, "establishing an independent IPL to build consensus on key projects and initiatives that address significant long-term problems".[4]

The Government is supportive of developing an IPL, and on 18 May 2023, the Government released its Infrastructure Action Plan, which states that Te Waihanga will work with Treasury to develop an IPL.[5]

Te Waihanga's website notes that work on the IPL will explore linkages with existing guidance, and planning and funding processes, including the IMS, Better Business Case (BBC) guidance, and the Monetised Benefits and Costs Manual (MBCM).[6]

[4] https://media.umbraco.io/te-waihanga-30-year-strategy/mrtiklkv/rautaki-hanganga-o-aotearoa.pdf

[5] https://www.treasury.govt.nz/sites/default/files/2023-05/infrastructure-action-plan-2023.pdf

[6] https://www.tewaihanga.govt.nz/major-projects/infrastructure-priority-list/

The first step in developing an IPL is to build an assessment framework, which will test whether an infrastructure project solves a significant long-term problem in a cost-effective way.

1.2.2. Work to date

In 2022, Te Waihanga began planning for the creation of an IPL. This involved engagements with a range of New Zealand Government agencies and Infrastructure Australia.[7] Te Waihanga also established an IPL Working Group to help scope and design what an IPL might look like.[8]

For an IPL to succeed, Working Group members agreed that (among other things) the IPL should:

- integrate with existing investment management processes; and
- minimise potential task duplication and administrative burden for agencies.

Initial work resulted in a report, *Options for progressing an Infrastructure Priority List*, which outlines different design options for the IPL, ranging from only assessing early-stage proposals to assessing proposals at all stages of the planning process. A common component across all the IPL design options was an assessment framework.[9]

[7] Assessment Framework Design Guidance for Supplier (Te Waihanga supplied document)

[8] Agencies represented on the Working Group included Te Waihanga, Treasury, Statistics New Zealand, Department of Internal Affairs, Department of Prime Minister and Cabinet, and the Ministry of Business, Innovation and Employment.

[9] Options for progressing an Infrastructure Priority List (Te Waihanga supplied report)

1.3. Role of the IPL

1.3.1. Role of the Infrastructure Priority List

Te Waihanga's legislation and *The Strategy* provide important context for the role of the IPL.

Te Waihanga's legislation (New Zealand Infrastructure Commission/Te Waihanga Act 2019) includes a function to provide advice in relation to the priorities for infrastructure (s 10(b)(iii)), as well as:

- to promote a strategic and co-ordinated approach to the delivery of current and proposed infrastructure projects (s 10(d));
- to provide and co-ordinate information about current and proposed infrastructure projects (s 10(e)); and
- to provide support services to current and proposed infrastructure projects (s 10(f)).

The Strategy includes a recommendation for an independent IPL that builds consensus on key projects and identifies significant long-term problems. Other potential aims for the IPL identified by Te Waihanga in its initial planning are:

- Improving project assurance;
- Building consensus on key projects and initiatives;
- Ensuring strategic alignment and value for money;
- Improving our knowledge of gaps and problems in the relevant sectors; and
- Identifying opportunities for agencies to cooperate or adopt alternative finance arrangements.

In developing our advice, we worked with Te Waihanga to refine the focus and objectives for the IPL. This helps develop an IPL that becomes a trusted and independent source of current and future infrastructure priorities, which influences decision-making and project preparation, and ultimately improves the lives of New Zealanders.

1.3.2. Who is the IPL for?

The IPL has the opportunity to have significant influence and impact across a broad range of stakeholders, potentially including:

- Members of the public who are interested in better understanding current and future infrastructure priorities;
- Decision makers within central government bureaucracy that are looking to fund high quality infrastructure projects;
- Politicians that are looking to understand key infrastructure priorities;
- Media looking to test whether funding decisions align with independent analysis;

- Project teams within central and local government (and potentially the private sector) who want to raise the profile of their projects and help secure funding;
- Planners that are looking to understand future infrastructure opportunities and challenges; and
- Industry participants that want sight of near- and longer-term projects.

1.3.3. Implications for the design of the Assessment Framework

Throughout this engagement, we considered the role of the IPL and how the IPL can be accessible, insightful, and relevant to a range of stakeholders. This means the assessment framework must be based on:

- evidence and consistent analysis of submissions;
- best practice but cognisant of existing business case practices and requirements in New Zealand;
- Identifying assessment outputs that can improve public transparency, inform government decision making and strengthen business case practices; and
- enabling prioritisation across projects rather than simply a gate to the being on or off the IPL.

We have taken these core concepts forward in our advice on recommended assessment stages, processes, and methodologies.

1.4. Scope of this report

This report provides our advice on Part 1 and Part 2 of the engagement. This report serves as advice to Te Waihanga and recognises that Te Waihanga will need to consider this advice alongside other relevant input and feedback from key stakeholders before determining the finalised stages, processes, and methodologies for the assessment framework.

There are also several areas that are outside the scope of this report, including:

- Developing templates, workbooks, and assessment guidance material for the assessment framework;
- Completing a comprehensive review of sector/agency strategies;
- Developing detailed technical guidance on how to implement methodologies;
- Advising on governance and internal procedure (e.g., file storage, assessment distribution, etc.) that will be needed to support the assessment framework; and
- Advising on or considering changes to the role and responsibilities of Te Waihanga, including any mandates around the assessment framework and IPL.

1.4.1. Structure of this report

The structure of this report is summarised in Table 1.

TABLE 1: REPORT STRUCTURE

Section	Overview
1. Context, objectives, and scope	Background to and scope of this report, as well as key objectives and target audience for the IPL
2. International infrastructure assessment processes	Approach to and findings from case study research (Deliverable 1) of five international examples of assessment and prioritisation processes
3. The New Zealand context	Review and findings on the gaps between New Zealand's investment system and Rautaki Hanganga o Aotearoa. We also outline key insights from our stakeholder engagements
4. Assessment Stages and Processes	Advice on potential options and our recommendations for assessment stages and processes (Deliverable 2)
5. Assessment Methodologies	Advice on commonly used assessment methodologies (Deliverable 3), their relative strengths and limitations, and our methodology for assessing strategic alignment with *The Strategy*
6. Testing the Assessment Framework	Overview and learnings from the use of sample projects to test the assessment stages, processes, and methodologies
7. Building options for the Assessment Framework	Advice on how Te Waihanga could develop Assessment Framework options – ranging from a minimum viable product to a do-maximum product. This section is informed by the preceding sections, with focus on the New Zealand context. High-level estimates of Te Waihanga/external resourcing required for the implementation and operation of the IPL Assessment Framework options.
Appendices	Appendix A: International Case Studies Appendix B: Detailed Process Map for each assessment stage Appendix C: Tool for strategic alignment with Rautaki Hanganga o Aotearoa Appendix D: Assessment methodologies and tools for value for money, risk, and uncertainty Appendix E: Sample projects

2. Learning from others: international assessment and prioritisation processes

2.1. Scope for Deliverable 1

Te Waihanga sought written summaries of five international examples of assessment and prioritisation processes for infrastructure investments. These examples must include:

- Infrastructure Australia's Infrastructure Priority List;
- One Australian state-level prioritisation process;
- One large international non-governmental organisation (e.g., a multilateral development bank or agency); and
- Two nominated by us.

Each case study is approximately two pages long and outlines key elements of each assessment framework that allows for comparison.

2.2. Selected case studies

In consultation with Te Waihanga, we have identified and researched five international case studies to inform the design of the New Zealand Infrastructure Priority List. These five case studies provide insights into the variety of assessment prioritisation processes undertaken internationally. They vary in terms of assurance focus, prioritisation approaches, links to government decision making and in how they use cost-benefit analysis.

Our approach to identifying potential case studies was to:

- leverage knowledge within the team from first or second-hand experience with infrastructure assessment practices; and
- review countries and practices identified in the following sources:
    - The IMF's Public Investment Management Assessment (PIMA) Framework,
    - The OECD's Survey on the Governance of Infrastructure, and
    - The Global Infrastructure Hub's Governmental Processes Facilitating Infrastructure Project Preparation. [10, 11, 12]

[10] https://www.imf.org/external/np/fad/publicinvestment/pdf/PIMA.pdf

[11] https://qdd.oecd.org/subject.aspx?Subject=GOV_INFRG

[12] https://www.gihub.org/project-preparation/

In selecting each case study, we were mindful of choosing countries that rated well in terms of infrastructure efficiency and outcomes. The five case studies we selected are:

- **Infrastructure Australia** and the Infrastructure Australia Assessment Framework;
- **Infrastructure NSW** and the Infrastructure Investment Assurance Framework;
- **World Bank** and the Infrastructure Prioritization Framework;
- **Republic of Chile** and the Sistema Nacional de Inversiones; and
- **Republic of Korea** and the Preliminary Feasibility Study.

The full case studies are available in Appendix A.

2.3. Key insights for the New Zealand context

We have prepared a summary of each case study, including how they are implemented, their core assessment approaches, their relative strengths and limitations, and key takeaways for the New Zealand context. Some of the common takeaways are:

- Strategic alignment and value-for-money are core parts of each assessment approach, though the tools and methodologies to assess these vary.
- Assessment stages are typically aligned with key business case artefacts, which helps assessment approaches fit within existing systems. This is usually achieved by detailed guidance on information requirements, including any information that is not always included in business case artefacts.
- Sector-specific requirements are frequently used to account for the key differences between sectors (e.g., minimum standards, nature of impacts and benefits, level of competition/availability, etc.). This includes using multi-criteria analysis or cost-effectiveness analysis for some sectors such as rural water supply. However, standardising approaches within these sectors helps improve rigour.
- Evaluation timing has a significant impact on the level of influence they can achieve but also the depth of information that is available for assessment.
- There are a variety of scoring approaches that can be used for assessments, including binary outcomes (e.g., yes/no), a multi-score system (e.g., green, orange, red 'traffic lights') and continuous scales (e.g., a calculated score between 0.5-1.0). The simpler binary and multi-score approaches are easier to communicate to key stakeholders, though do not provide as much insight on the relative priority between projects.

Table 2 overleaf, summaries the key takeaways from each case study, with further information available in the individual case studies.

TABLE 2: KEY INSIGHTS FROM CASE STUDIES

Case study	Key takeaways for the New Zealand context
Infrastructure Australia	• **Problem analysis:** A quantitative approach to problem and opportunity analysis helps improve early-stage proposal rigour. However, a rigid threshold for inclusion on the priority list limits strategic considerations and can have unintended longer-term consequences (e.g., length of priority list). • **Review timing**: Only mandating reviews at the detailed business case stage means projects are usually well-advanced but have less scope for influence. Projects often have funding confirmed or are even under delivery. • **Focusing on the evidence:** Allowing submissions from any source and from other Infrastructure Australia analysis enables the Infrastructure Priority List to identify nationally significant infrastructure issues, even if jurisdictions do not perceive them as so.
Infrastructure NSW	• **Risk-based assessments:** Using a matrix of cost and risk has helped ensure assessments are robust but not overly burdensome for smaller and simpler projects. • **Early influence:** Mandated gates at initial project stages provides a greater opportunity to influence project outcomes while early planning is still underway. • **Easy-to-understand outcomes:** While a traffic light rating system can overly simplify project complexities, it is easy to understand and strongly incentivises stakeholders to avoid "red lights". • **Delivery risk focus:** A focus on optimising project outcomes and reducing delivery risk means that even if government funds a project that is not value-for-money, the assessment can still help improve or optimise infrastructure outcomes.
World Bank	• **Development of indices:** There are quantitative approaches to testing social-environmental and financial-economic outcomes. A similar approach could be developed to evaluate strategic alignment and value for money. However, a key challenge to this approach would be the development of consistent indicators that would be applicable across all project types. • **Steppingstone:** The case study provides a fairly adaptable framework for assessing large groups of projects, which could potentially be considered as an interim step towards a more comprehensive prioritisation system. It could also be applied to one-off investment challenges, such as disaster recovery. • **Timing and budget:** This prioritisation process typically occurs at the investment decision phase of the infrastructure lifecycle, with the outputs of the process helping to prioritise projects against what can be achieved within known budget constraints.

Case study	Key takeaways for the New Zealand context
Republic of Chile	• **Sector-specific requirements:** Developing different requirements for unique sectors (or sub-sectors) enables a balance of rigour and practicality. Creating a consistent quantitative framework for multi-criteria analysis can lift rigour in these cases. • **Choosing from validated projects:** While this framework does not prioritise beyond a positive rating, it requires decision makers in agencies to prioritise and allocate funding to a set of projects that have rigorously demonstrated value-for-money. • **Ex post analysis:** The system includes ex post evaluations of a representative sample of projects each year, giving them important insights into project outcomes as well as evaluation rigour.
Republic of Korea	• **Evaluation approach:** A weighted multi-criteria analysis can be used to combine a range of different inputs, including economics, policy alignment, and regional outcomes. The weightings are transparent and reduce the focus on a single output such as a benefit-cost ratio. • **Sector specific guidelines:** Whilst the same general framework and steps apply to all projects, a number of sector-specific guidelines have also been developed. • **Timing:** The agency undertakes the assessment closer to the start of the project development lifecycle. More detailed analyses are undertaken by line ministries once a budget decision has been made. • **Independence:** An independent research institute undertakes the assessment on behalf of the Korean Ministry of Economy and Finance which promotes transparency and objectivity.

The case studies revealed the wide range of infrastructure assessment and prioritisation processes that are being used in Australia and internationally. They each provide different options in terms of stages, processes, and methodologies, which have been drawn out in the summary table above and in the individual case studies.

At a strategic level, the case studies show that there are several key trade-offs that may need to be made when designing and implementing these frameworks. These trade-offs are shown overleaf in Figure 1 and Table 3.

FIGURE 1: TRADE-OFFS IDENTIFIED IN THE CASE STUDIES

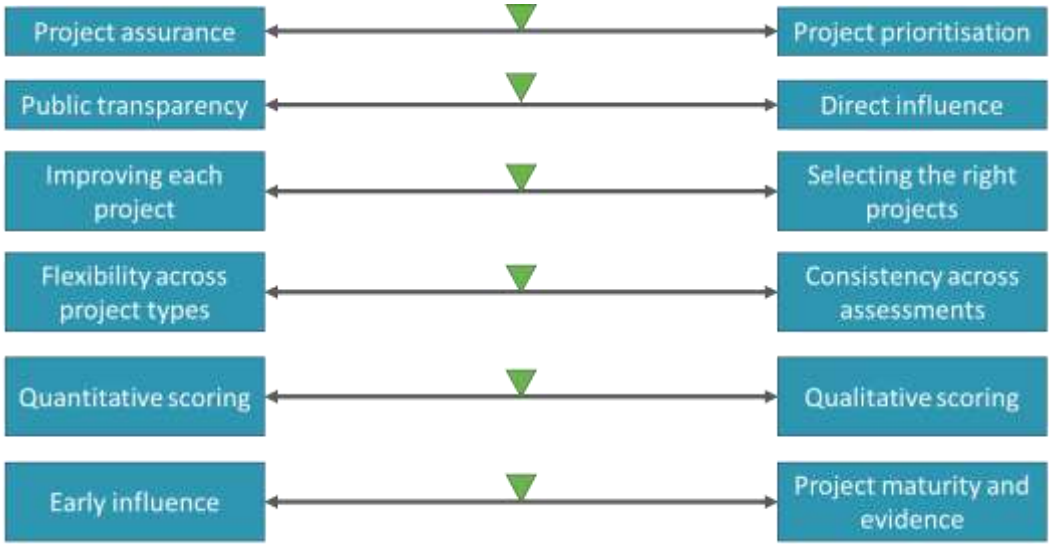

TABLE 3: SUMMARY OF KEY TRADE-OFFS FROM CASE STUDIES

Trade-off	Description
Project assurance *Versus* Project prioritisation	Case studies typically showed a focus on either project assurance or prioritisation. Assurance-focused processes (e.g., Infrastructure NSW) usually had clear mandates to assess projects at several stages of their planning to test, and have confidence in, development processes. Prioritisation-focused processes (e.g., World Bank) were typically less tied to government processes and decision making but instead focused on project outcomes and providing information on the relative merit of different projects. This trade-off will impact on the assessment process and outputs, and to what extent the assessment framework focuses on project merit compared with project development.
Public transparency *Versus* Direct influence	We observed that many case studies had a focus on either having greater public transparency of assessments or on having stronger (potentially even legislative) influence on decision-making. While public transparency and public perceptions can influence decision making, it can be difficult for a framework to have high levels of transparency (often linked with independence) if they are directly involved with decision making. This trade-off will clearly influence the types of assessment outputs and who this is communicated to, as well as how submissions may be made.

Trade-off	Description
Improving projects *Versus* Selecting the right project	Assurance and prioritisation processes can help improve projects and the quality of decision making. However, we observed a difference across case studies in how they focus on optimising projects or on selecting the right projects. Infrastructure NSW adopts a traffic light rating system that is used to flag key project risks and limitations, as well as recommendations (some mandatory) that projects respond to. The case studies for Chile, Korea and Infrastructure Australia had a greater focus on assessing projects and determining the equivalent of a pass/fail at each stage. This is linked with the project assurance and project prioritisation trade-off, as a prioritisation focus is likely to favour 'selecting the right projects' as its approach.
Quantitative scoring *Versus* Qualitative scoring	Different case studies used different quantitative and qualitative approaches to assessing and scoring projects. A quantitative score can improve visibility, enforce rigour, and limit subjectivity, but can also lead to a loss of nuance. The Korea case study adopts a highly quantitative process and rating system for projects, which culminates in a single score rating from 0.0 to 1.0, where a score above 0.5 is successful. On the other hand, Infrastructure Australia does not publish any ratings or scores for projects, instead advising whether a project has been added to their priority list or not and providing a summary of their evaluation. This trade-off will impact how easily assessment outputs can be communicated to different stakeholders and to what extent these oversimplify project nuances. There is also a relationship to the project assurance and project prioritisation trade-off, where a more quantitative scoring approach can help prioritise within a group of projects.
Early influence *Versus* Project maturity and evidence	Reviewing a project early in its development can provide a greater opportunity to influence its progress and outcomes but there is typically less detailed and rigorous evidence to undertake an assessment on. This makes it more challenging to be confident in assessment outcomes. The Infrastructure Australia case study revealed that detailed business case assessments can often be too late in the project lifecycle, with some projects funded or even under delivery. On the other hand, the information assessed by Infrastructure NSW at their initial gate (gate 0) cannot easily be used to determine if a proposal is nationally significant. This trade-off can be partially addressed through developing multiple assessment stages but is still a key consideration for refining the focus of a framework and understanding where it may be most influential.

We discussed these potential trade-offs with Te Waihanga, who provided us with direction on these trade-offs for the New Zealand context with an understanding that priorities could shift as time passes and the IPL is improved:

- Project prioritisation is a strong focus over project assurance;
- Public transparency is a strong focus over direct influence;
- Selecting the right projects is a focus over improving each project;
- Quantitative scoring is a focus over qualitative scoring; and
- Early influence is a slight focus over project maturity and evidence.

These preliminary directions have informed our development of and advice on the assessment framework.

2.4. Approach to assessing the case studies

To enable a high-level comparison between the frameworks, we subjectively scored each against the following criteria:

1. **Rigour:** To what extent do they provide a robust and comprehensive assessment of projects?
2. **Adaptability:** How flexible are the frameworks to considering projects of different scales, sectors, development stages and other factors?
3. **Influence:** How effective have they been in influencing infrastructure outcomes? This is potentially through improving project planning practices and/or investment decision making.

We developed these criteria based on the desired role of the IPL (see Section 1.3). Table 4 overleaf sets out the key components we considered for each criterion.

TABLE 4: CONSIDERATIONS FOR SCORECARD CRITERIA

Criterion	Key questions
Rigour	• How detailed is the assessment? How is this reflected in the guidelines, process, and outputs? • What evidence is needed to support a submission? • How comprehensive is an assessment? Does it thoroughly consider all elements of a project, from its strategic alignment through to deliverability? • How independent are assessors from project proponents and funding decision makers?
Adaptability	• How does the assessment adapt for projects of different scale, risk, and maturity? • How do assessment stages, processes and methodologies adapt for projects in different sectors?
Influence	• What impact does an assessment have on funding and budget decisions? • What impact do the assessment requirements have on project planning processes? • What influence does an assessment outcome have on future stages of project development? • How do assessment outcomes impact on public perceptions of projects?

These key questions guided our scoring of each criterion based on our firsthand experiences with assessment processes (Infrastructure Australia and Infrastructure NSW) and publicly available research and studies on assessment processes (World Bank, Chile, and Korea).

2.5. Summary of assessment

The assessment findings from the case studies are summarised in Table 5.

TABLE 5: SUMMARY OF CASE STUDY ASSESSMENT FINDINGS

Case study	Rigour	Adaptability	Influence
Infrastructure Australia	◕	◑	◔
Infrastructure NSW	◕	◕	◕
World Bank	◑	◕	◑
Republic of Chile	◑	◑	◕
Republic of Korea	◕	◑	◕

Note: ● denotes the strongest score whereas O denotes the weakest score.

Our assessment found that Infrastructure Australia, Infrastructure NSW, and the Republic of Korea all had highly rigorous assessment processes, though each did have relative strengths. Infrastructure Australia had a greater focus on cost-benefit analysis and value-for-money, whereas Infrastructure NSW undertakes detailed assessment of deliverability considerations.

The Infrastructure NSW and World Bank case studies were the most adaptable, with Infrastructure NSW using a risk- and cost-based approach to determining assessment requirements. The World Bank example provide a flexible prioritisation framework that could be applied to a wide range of projects. While it has been developed for assessing projects within a sector, it could potentially be applied to multiple sectors if common assessment criteria can be developed.

The Infrastructure NSW, Republic of Chile and Republic of Korea case studies were shown to be the most influential, as these frameworks had stronger legislated roles within decision-making processes. While Infrastructure Australia has a mandate to review business cases that are seeking a certain threshold of Australian Government funding, a recent independent review of Infrastructure Australia highlighted lack of influence as a concern.[13] Though we consider that its rigorous process has likely helped improve the quality of business cases in Australia).

[13] https://www.infrastructure.gov.au/department/media/publications/independent-reviewinfrastructure-australia

3. The New Zealand Context

3.1. Scope of the New Zealand context

Te Waihanga sought written advice on how the IPL Assessment Framework could be applied in and align with New Zealand's unique context.

In the Part 1 report, we identified gaps in New Zealand's IMS given *The Strategy's* five objectives, and 10 core principles for infrastructure decision making. We then put forward five high-level design details for the Assessment Framework that may help fill these gaps. This work was completed during Part 1 so that we could:

1. get a better understanding of how well the IMS already enables *The Strategy*; and
2. design an integrated Assessment Framework that minimises task duplication and fills gaps where they may exist.

This report (Part 2) builds on our work from Part 1 by outlining key insights from our stakeholder engagements with Treasury, Ministry of Education (MoE), Waka Kotahi, Auckland Council, and Meridian. We also discuss Treasury's work programme on strengthening the IMS. This is an important consideration as Treasury's processes (Quarterly Investment Reporting, Better Business Case etc) significantly influence the design of the IPL's Assessment Framework.

Insights from the New Zealand context, alongside other findings from Part 1, are used to inform the development of the Assessment Framework options (see Section 7).

3.2. Gaps in New Zealand's investment system

To identify gaps between the investment system and *The Strategy* we followed two steps.

1. **Defining what good looks like** by putting forward practical examples for how New Zealand's investment system could support *The Strategy's* five strategic objectives and 10 core principles for infrastructure decision making. For example, Objective 1: Enabling a net-zero carbon emissions Aotearoa, could be supported by guidance and/or evaluation criteria related to whole-of-life carbon emissions analysis.
2. **Comparing what good looks like against the existing IMS** by examining a sample of key investment system components including:
    a. project appraisal guidance,
    b. investment evaluation/prioritisation processes, and
    c. system settings (specifically under the Investment Management and Asset Performance in the State Services Cabinet Circular CO(19)6)).

The gaps identified in this report are informed by Te Waihanga's perspective and context. As such, these gaps should not be interpreted as deficiencies in the processes or guidance of other organisations/agencies, considering their distinct context, objectives, and overall role.

3.2.1. How well does the IMS enable the five objectives?

The Strategy's five objectives

New Zealand faces many infrastructure challenges. We have a $210b infrastructure deficit, our population is changing, delivery costs are increasing, and the effects of climate change loom large.[14] Based on these challenges, Te Waihanga developed five strategic objectives, which are things the infrastructure system needs to do to achieve a thriving New Zealand (Table 6).[15]

TABLE 6: *THE STRATEGY'S* FIVE OBJECTIVES

Objectives	Through…
Enabling a net-zero carbon emissions Aotearoa	rapid development of clean energy and reducing the carbon emissions from infrastructure
Supporting towns and regions to flourish	better physical and digital connectivity and freight and supply chains
Building attractive and inclusive cities	better long-term planning, pricing, and good public transport. This will help us respond to population growth, unaffordable housing, and traffic congestion
Strengthening resilience to shocks and stresses	taking a coordinated and planned approach to risks based on good-quality information
Moving to a circular economy	setting a national direction for waste, managing pressure on landfills and waste-recovery infrastructure, and developing a framework for the operation of waste-to-energy infrastructure

Step 1: Define what good looks like

New Zealand's IMS means the processes, rules, capabilities, information, and behaviours that work together to shape the way investments are managed throughout their lifecycles.[16]

The investment system is made up of many components that work together to transform New Zealand's needs into outcomes in a way that maximises public value. For the purposes of this analysis, we have identified three key components of the investment system (

[14] https://media.umbraco.io/te-waihanga-30-year-strategy/mmahiykn/rautaki-hanganga-o-aotearoa-new-zealand-infrastructure-strategy.pdf

[15] Definitions in Table 6 based on the Overview Section of The Strategy

[16] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management-system

Table 7).

TABLE 7: KEY COMPONENTS OF AOTEAROA'S INVESTMENT MANAGEMENT SYSTEM

Key components of New Zealand's IMS	Examples
Rules (the specific context, expectations, and roles for agencies/organisations in the system)	Cabinet Manual 2023, Cabinet Office circulars (CO(19)6 and CO(18)2). Public Finance Act 1989 etc
Guidance	Better Business Case guidance, Social Cost-Benefit Analysis guidance, Monetised Benefits and Costs Manual etc
Evaluation/prioritisation processes	Investment Panel process, Budget process, Waka Kotahi's Investment Prioritisation Method, Gateway reviews etc

It is important to acknowledge that there are other important components of the investment system. These include (but are not limited to) information on upcoming investments (e.g., Treasury's Quarterly Investment Reporting Tool), planning for the future (e.g., Long-Term Insights Briefings), and capability building (e.g., formal Better Business Case training through the Association of Project Management Group).

During our scan of New Zealand's IMS, we found that:

- Guidance was detailed enough to help proponents provide information on how their project would enable the five objectives (with some gaps); and
- Evaluation/prioritisation processes were detailed enough to help assessors identify projects that would enable the five objectives (with some gaps).

In contrast, New Zealand's investment management rules and expectations (outlined in CO(19)6) were not found to be effective in enabling the five objectives. This is because the rules are at a much higher level of detail and are operational/process-focused, compared to the five objectives which are outcomes-focused. As such, we did not consider how well investment rules and expectations currently enable the five objectives.

Table 8 shows what good looks like by outlining practical examples for how guidance and evaluation/prioritisation processes could be supporting the five objectives. The objectives (e.g., Building attractive and inclusive cities) can be interpreted and supported in countless ways – even outside of the context of infrastructure. To ensure our examples were relevant and bounded, we based them on:

- The subheadings under the objectives in Section 6 of *The Strategy*,
- The description of the objectives in the Overview Section of *The Strategy*, and
- Section 7.1 of the *Assessment Framework Design Guidance for Supplier* document you provided us.

TABLE 8: HOW THE INVESTMENT SYSTEM COULD SUPPORT THE FIVE OBJECTIVES

Objectives	What good looks like: Objectives are enabled through technical guidance AND/OR evaluation criteria related to:
Enabling a net-zero carbon emissions Aotearoa	• Quantifying whole-of-life carbon emissions and/or a project considering its role in emissions reduction • Quantifying indirect emissions (particularly related to expected changes in emissions from transportation) • The long-term cost of carbon • Renewable energy generation and integration
Supporting towns and regions to flourish	• The accessibility of infrastructure networks, with a focus on towns and regions (closing or minimising frictions to smooth the transfer of people, goods, services, and data) • The efficiency and security of the freight and national supply chain
Building attractive and inclusive cities	• Alternative funding methods (e.g., user-pays, land value capture) • Accommodating changes in long-term demand (e.g., population and demographic change) • Reducing congestion (e.g., through modal-shift and/or time savings) • The interaction between land-use settings and infrastructure • Better management of resources or conservation • Access to opportunities, with a focus on public and active transport
Strengthening resilience to shocks and stresses	• Addressing a known climate change adaptation issue • A project considering its own resilience and sustainability • Enhancing redundancy in our infrastructure networks and/or improving assurance of minimum levels of service • Scenario testing and the multi-hazard approach (assessing and mitigating multiple risks simultaneously)
Moving to a circular economy	• Quantifying the waste reduction opportunity and/or a project considering its role in waste reduction • Waste minimisation plans • The use of standardised or energy-efficient designs, prefabrication, or recycled materials/capital plant • Waste-to energy generation and integration

Step 2: Compare what good looks like against the existing system

In Table 9, we compare the bullet points in Table 8 against a sample of existing evaluation/prioritisation processes. **This demonstrates the extent to which evaluation/prioritisation processes help assessors identify projects that will enable the five objectives.** Table 9 also outlines potential gaps.

In Table 10, we compare the bullet points in Table 8 against a sample of existing project appraisal guidance. **This demonstrates the extent to which existing guidance makes it easy for proponents to provide high-quality information about how their project will support the five objectives.** Table 10 also outlines potential gaps.

We selected the sample evaluation/prioritisation processes and guidance based on our conversations with you and our knowledge of New Zealand's IMS.

Evaluation/assessment processes

TABLE 9: EFFECTIVENESS OF EVALUATION PROCESSES TO ENABLE THE 5 OBJECTIVES

No evaluation criteria	
High-level assessment **OR** considers whether relevant analyses were completed	○
Projects are rated based on **output of analyses** for less than half of the bullet points in Table 8 (e.g.., higher priority is given to projects that reduce emissions)	○○
Projects are ranked based on **output of analyses** for more than of the bullet points in Table 8	○○○

	Do existing evaluation/prioritisation processes help assessors identify projects that will enable the five objectives?				
	Enabling a net-zero Aotearoa	**Supporting towns and regions**	**Attractive and inclusive cities**	**Resilience to shocks and stresses**	**Moving to a circular economy**
Treasury's Budget Evaluation Framework	○			○	
Waka Kotahi Investment Prioritisation Method	○○	○○○	○○	○○	
Auckland Councils Capital Prioritisation Framework	○○○		○	○○	
Wellington City Council's Community Outcomes Framework	○		○	○	○
Key gaps	Whole-of-life emissions analysis (embodied) is often ignored Assessments do not consider renewable energy generation/ integration	No criteria on improving connectivity (digital) in rural areas Consideration of projects that address "missing links" in networks could be clearer	No criteria on: Funding sources or better resource management If the project makes sense given land-use Accommodating changes in demand	No consideration of /criteria for: The resilience and vulnerability of the project itself to shocks and stresses Scenario testing	Not enabled through current evaluation/ prioritisation processes. However, it may be enabled through other government strategies/ plans.

Project appraisal guidance

TABLE 10: EFFECTIVENESS OF PROJECT APPRAISAL GUIDANCE TO ENABLE THE 5 OBJECTIVES

No evaluation	
High-level guidance is provided **OR** guidance on monetisation is provided	○
Detailed guidance is provided for less than half of the bullet points in Table 8	○○
Detailed guidance is provided for more than half of the bullet points in Table 8	○○○

	Does existing guidance make it easy for proponents to give high-quality information/evidence on how their project will facilitate the five objectives?				
	Enabling a net-zero Aotearoa	**Supporting towns and regions**	**Attractive and inclusive cities**	**Resilience to shocks and stresses**	**Moving to a circular economy**
Treasury's Social Costs and Benefits Guide				○	
CBAX tool and use guide	○		○		
Monetised benefits and costs manual (MBCM)	○○	○○○	○○	○○	
Non-monetised costs and benefits manual	○○	○	○○	○○	○
Costs and benefits of Urban Development	○		○○		
Key gaps	Guidance on: Quantification of embodied emissions (*upcoming guidance on buildings*) Quantification of indirect emissions (sources other than vehicles)	Guidance on: Quantifying the benefits of improving digital connectivity	Guidance on: Land-use and transport interaction modelling How/when to use alternative funding sources Quantifying the benefits of better resource management	Guidance on: Vulnerable networks at the local level Evaluating the exposure of new projects Quantification of risk to service levels by unplanned disruptions	Guidance on: Quantifying the waste reduction Relative benefits of using different materials/ designs Robust waste minimisation plans

3.2.2. How well does the IMS enable the 10 core principles for infrastructure decision making?

10 Core principles for infrastructure decision making

Compared to other OECD countries, New Zealand achieves poor outcomes from its infrastructure spending, we also deliver infrastructure less efficiently.[17] In 2019, we ranked 43rd out of the 54 high-income countries on the World Economic Forum's infrastructure quality index.[18]

We achieve poor outcomes (in part) because we are a low-density country with challenging terrain and moderately performing public investment processes.[19] International evidence shows that good decision-making, supported by robust public investment management and a stable long-term pipeline of investment intentions, is essential for lifting performance.[20]

To help improve outcomes, *The Strategy* outlines 10 core principles for infrastructure decision making (Table 11). These principles are adapted from OECD best-practice guidance and Infrastructure Australia guidance.[21, 22, 23]

TABLE 11: 10 CORE PRINCIPLES FOR INFRASTRUCTURE DECISION MAKING

Principles
1. Infrastructure problems and opportunities are quantified
2. Needs are identified in response to quantified infrastructure problems
3. Agencies invest in feasibility studies to scope potential options
4. Agencies ensure options can be delivered affordably
5. Projects are assessed by agencies in detail through a business case
6. Agencies assess alternative funding sources for each project
7. Meaningful stakeholder engagement is undertaken
8. Information supporting infrastructure decisions is publicly released
9. Staged and post-completion reviews are completed and released
10. Decision-making processes for capital funds/broader programmes are robust, transparent, and prioritise value for money

[17] https://tewaihanga.govt.nz/media/te-waihanga-30-year-strategy/2ilbayro/investment-gap-or-efficiency-gap.pdf

[18] https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

[19] https://tewaihanga.govt.nz/media/te-waihanga-30-year-strategy/2ilbayro/investment-gap-or-efficiency-gap.pdf

[20] https://media.umbraco.io/te-waihanga-30-year-strategy/mmahiykn/rautaki-hanganga-o-aotearoa-new-zealand-infrastructure-strategy.pdf

[21] https://www.oecd.org/gov/getting-infrastructure-right.pdf

[22] https://www.oecd.org/gov/infrastructure-governance/recommendation/

[23] https://www.infrastructureaustralia.gov.au/publications/ infrastructure-decision-making-principles

Step 1: Define what good looks like

The 10 core principles of infrastructure decision making are operational/process-focused and outline what organisations in the investment system should be doing at all points in the life of an infrastructure project. These principles do not have the power to direct organisations, but instead outline best-practice guidance.

To test how well the 10 core principles are enabled, we needed to compare them to other process-focused government artifacts, such as investment rules and system settings.

The rules and expectations for how government organisations manage the investment of public money are outlined in government legislation, cabinet circulars (i.e., information related to government operations), and government policies. Examples of these include:

- Cabinet Circular on Investment Management and Asset Performance in the State Services (CO(19)6);
- Cabinet Circular on Proposals with Financial Implications and Financial Authorities (CO(18)2);
- Local Government Act 2002 (LGA); and
- Public Finance Act 1989 (PFA).

Based on our conversations with you and our knowledge of New Zealand's investment system, we know that CO(19)6 is particularly relevant to the 10 core principles for infrastructure decision making. One reason for this is because their underlying purposes are very similar – to make the best investment choices, ensure the investment of public funds will provide value for money, and to improve New Zealanders' wellbeing.

As such, CO(19)6 is a natural starting point to understand how well the investment system is supporting the 10 core principles. However, we understand that policies and rules are not always followed or enforced, so we also consider how infrastructure delivery agencies/organisations operate in practice. We have done this through desktop research and stakeholder engagements.

Key limitations

CO(19)6 is in the process of being updated by the Treasury and will likely be superseded by the end of 2023. We did not have access to the draft or finalised update of the Cabinet Circular on Investment Management. As such, this analysis focuses on CO(19)6 only, as this was the current version during our assessment of the New Zealand Context.

Further information on upcoming changes to New Zealand's IMS is outlined in Section 3.6.

It is also important to note that CO(19)6 applies to central government organisations, Crown agents, and companies listed in schedule 4a of the PFA.[24] As such, our gaps analysis for the 10 core principles is focused on the central government context. There would likely be value in future work that looks at gaps between the 10 principles and other sources of public funding for infrastructure, such as local government.

What does good look like?

Table 12 shows what good looks like by outlining practical examples for how CO(19)6 could be supporting the 10 core principles. We based these examples on Table 3 in Section 7.1 of *The Strategy*, "Better Decision Making".

TABLE 12: HOW COULD THE INVESTMENT SYSTEM SUPPORT THE 10 CORE PRINCIPLES

Principle	What good looks like: Principles are enabled through system settings common practice, and policy:
1.Infrastructure problems and opportunities are quantified	• Agencies conduct long-term planning • Analysing how existing infrastructure will perform and the level of service it will provide in the future
2.Needs are identified in response to quantified infrastructure problems	• Infrastructure needs are framed as responses that may be required under several future scenarios • Agencies publicly release planning information to explain the problem and potential solutions
3.Agencies invest in feasibility studies to scope potential options	• Costs, benefits, and risks of different options are identified early • Agencies consider a range of options that don't require construction (e.g., regulation, pricing)
4.Agencies ensure options can be delivered affordably	• Agencies consider low-cost options and planning/ design minimises delivery costs • Land needed for infrastructure is protected by delivery agencies
5.Projects are assessed by agencies in detail through a business case	• A business case is used to rigorously examine a potential project's benefits relative to its costs • A preferred option or cost profile is not announced until detailed analysis is complete

[24] Organisations in scope of CO(19)6 include: all departments (including departmental agencies) as defined by the Public Finance Act 1989 (PFA); Crown agents; Autonomous Crown entities; Independent Crown entities; Crown entity companies, including Crown Research Institutes; companies listed on Schedule 4A of the PFA.

Principle	What good looks like: Principles are enabled through system settings common practice, and policy:
	• Agencies show that projects are resilient to change under a range of future scenarios
6.Agencies assess alternative funding sources for each project	• Delivery agencies minimise the need for public funds by considering other funding options
7.Meaningful stakeholder engagement is undertaken	• Delivery agencies should engage with relevant stakeholders when identifying problems and before arriving at a preferred solution
8.Information supporting infrastructure decisions is publicly released	• All analyses underpinning long-term plans and option development and assessment are released, including business cases
9.Staged and post-completion reviews are completed and released	• Reviews should focus on whether the project was delivered on time and on budget, measuring whether the benefits were realised over time, and extracting lessons to feed into future infrastructure development and delivery.
10.Decision-making processes for capital funds/broader programmes are robust, transparent, and prioritise value for money	• The objective, scope, scale, and expected benefits of a funding programme are defined and reported against clear assessment criteria and objectives

Step 2: Compare what good looks like against the existing system

In Table 13, we compare the bullet points in Table 12 against CO(19)6. We also consider how delivery organisations operate in practice. This demonstrates the extent to which CO(19)6 and the practice of CO(19)6 enables the 10 core principles. Table 13 also outlines potential gaps.

TABLE 13: 10 CORE PRINCIPLES COMPARED TO CO(19)6

Key

Not addressed in CO(19)6	
Partially addressed (or implicit) in CO(19)6	○
Fully addressed in CO(19)6 but not or only partially actioned in practice	○○
Fully addressed in CO(19)6 and fully actioned in practice	○○○

Assessment

Principle	CO(19)6	Description of potential gaps/issues
1.Infrastructure problems and opportunities are quantified	○	No wording on quantifying infrastructure problems/ opportunities Long Term Insights Briefings are currently too high level to quantify problems. But there may be opportunity here Lack of quantitative analysis of how existing infrastructure will perform under a range of future scenarios
2.Needs are identified in response to quantified infrastructure problems	○	Long Term Investment Plans were once mandated under CO(15)5 but are not mandated under CO(19)6 Lack of anticipating/scanning problems and needs. Investments are often identified as problems arise or in response to long-standing issues/deficits (reactionary investment) Root problem is not fully understood or quantified. There is often a disconnect between proposed solution and root problem, so solutions are retrofitted and may not be fit for purpose
3.Agencies invest in feasibility studies to scope potential options	○	Lack of direction to consider non-built options that make the most of existing infrastructure such as price settings, or regulatory changes Risk and uncertainty doesn't often feed back into economic appraisal, so costs and benefits may not be meaningfully compared
4.Agencies ensure options can be delivered affordably	○○	Lack of long-term problem identification makes it difficult to minimise costs through early planning, staging, or land protection
5.Projects are assessed by agencies in detail through a business case	○○	Lack of enforcement or exercise of discretion means that businesses cases are often not completed or are not completed well. A lack of enforcement also signals that there is a poor perception of the usefulness of business cases at the decision-maker level Projects are often announced before the business case process is complete, which risks perpetuating a view that business cases are a compliance exercise Projects are not resilient to change under a range of futures as scenario testing is often not completed

Principle	CO(19)6	Description of potential gaps/issues
6.Agencies assess alternative funding sources for each project	○○	Efficiency of funding and pricing is often secondary to political drivers and equity/distributional concerns (equity-efficiency trade-offs should be investigated further – equity can often be addressed through other systems like transfers or rebates) Central-government often intervenes to fund gaps in assets/services as opposed to agencies investigating alternative funding sources
7.Meaningful stakeholder engagement is undertaken		Stakeholder engagement is not detailed in CO(19)6 Lack of engagement in the Think phase of the investment lifecycle Stakeholders often lack sufficient detail to contribute
8.Information supporting infrastructure decisions is publicly released	○	Publicly releasing business cases and other investment information is not detailed in CO(19)6. However, sometimes information on large projects is proactively released Decisions are often a black box and there is a general lack of transparency in decision-making Key agencies/organisations and system leads irregularly publish information on proposed projects Lack of system leadership as Cabinet-approved business cases are not often shared on the Public Sector Intranet (for sharing with agencies as outlined in CO(19)6)
9.Staged and post-completion reviews are completed and released	○○	Not all reviews that are completed are publicly released Key agencies/organisations and system leads irregularly/rarely publish post-completion and benefits realisation reviews. This may risk losing opportunities to learn from previous project lessons
10.Decision-making processes for capital funds/broader programmes are robust, transparent, and prioritise value for money	○	Over last decade, over $32b has been put towards infrastructure-related capital funds.[25] Criteria for assessing projects and reporting requirements is not clear or consistent across funds. It is unclear if investments deliver against objectives Inconsistent project appraisal and delivery

[25] Options for progressing an Infrastructure Priority List (Te Waihanga supplied report)

Principle	CO(19)6	Description of potential gaps/issues
		Lack of ability to make trade-offs across infrastructure portfolio

3.3. Gap register

In Section 3.2, we identified a range of gaps in the existing IMS. Table 14 below outlines key gaps and related design details to help fill these gaps through the IPL's Assessment Framework.

These key gaps have been informed by our analysis and the *Assessment Framework Design Guidance for Supplier* document Te Waihanga provided.

Later, in Section 3.5, we outline a full register of high-level design details informed by the New Zealand Context (i.e., insights from the gap analysis and stakeholder engagement).

TABLE 14: GAP REGISTER

Gaps	High-level design details to fill gaps
Public transparency of decision making	• Publicly release information on infrastructure project assessments and how they were assessed (similar to Infrastructure Australia) • Provide meaningful feedback to proponents, particularly if projects do not make the list (e.g., how can the project make the list, or let proponents know if the project is out of scope/not appropriate)
Oversight: Ability to make trade-offs across infrastructure portfolio	• The Assessment Framework should be general enough to assess all types of infrastructure – even projects that would not typically be provided or funded by central government • Do not use "infrastructure sector" as a filter for assessments
Infrastructure needs/problem identification	• Te Waihanga develops an appropriate evidence base to assess long-term infrastructure needs/problems • These long-term needs then undergo the same assessment process as all other early-stage projects, and if successful, are included on the IPL (noting that they need a proponent)
Strategic alignment with *The Strategy*	• Create a bespoke process and/or methodology to assess the strategic alignment of proposals against the five objectives in *The Strategy*
Technical guidance	• Build flexibility into the Assessment Framework so that over time it can be updated to accommodate new technical guidance and/or sector specific guidance

	• Te Waihanga will be able to identify common weaknesses and strengths of proposals over time (given a critical mass of submissions). As such, Te Waihanga has an opportunity to provide guidance (sector or methodology specific) where there are clear gaps

3.4. Stakeholder engagement on current IMS

Between 3 July and 20 July 2023, we held stakeholder engagements with Treasury, MoE, Waka Kotahi, Auckland Council, and Meridian.

The purpose of the public sector engagements was to:

- get feedback on the initial design of the IPL's Assessment Framework; and
- ensure that we represented the New Zealand context accurately and fairly, particularly with respect to our gap analysis in Section 3.2.

We engaged with Meridian to understand its process for making decisions about infrastructure investments. We also wanted to see whether a private sector company sees value in an IPL and would consider submitting projects/infrastructure problem to the IPL.

During this project, we spoke with five stakeholders. We do not expect insights from a small sample of engagements to represent all stakeholders. Instead, these engagements were used to test stakeholders' initial reactions, so that we could get a better understanding of how to design and apply the Assessment Framework given the New Zealand context.

We recommend that Te Waihanga continue engaging with the public sector on the Assessment Framework, particularly with Investment Officials and agencies such as Te Arawhiti and Te Puni Kōkiri (see Section 5.2.5).[26]

It may also be beneficial to conduct a public consultation process on the IPL when major IPL design decisions have been agreed within Te Waihanga, and between Treasury and Te Waihanga.

3.4.1. Representing the New Zealand context accurately

We provided customised versions of our gap analysis (see Section 3.2.1) to Auckland Council and Waka Kotahi prior to our engagements with them. Waka Kotahi and Auckland Council did not receive the full gap analysis, rather, we tailored information relevant to each organisations' guidance and/or investment prioritisation processes.

[26] Investment Officials is a group of investment system leaders from Treasury, Te Waihanga, Department of the Prime Minister and Cabinet, Department of Internal Affairs, and Statistics New Zealand.

Overall, Waka Kotahi and Aukland Council did not have issue with the findings of the gap analysis. Where feedback was provided, we have incorporated the suggestions to improve the accuracy and completeness of the gap analysis.

Due to timing constraints, we did not provide Treasury with the gap analysis between CO(19)6 and *The Strategy's* 10 core principles for infrastructure decision making. As such, Treasury should be given the opportunity to provide feedback on the analysis in Section 3.2.2 prior to this report being publicised.

3.4.2. Key insights from stakeholder engagements

Opportunities for the IPL

a. Long-term thinking about infrastructure needs

Stakeholders noted that there is a lack of long-term thinking about infrastructure. This is supported by evidence that New Zealand is ranked 22nd out of the 30 OECD countries for long-term strategic vision for infrastructure.[27]

Stakeholders agreed that individual project assessments and selecting good projects is important, but emphasised the need for broader thinking. For example, Te Waihanga could run an "infrastructure needs assessment" to identify Aotearoa's long-term infrastructure needs/problems at a detailed level (e.g., at a project/programme level).[28] We discuss whether an "infrastructure needs assessment" should be integrated into the IPL's workstream in Section 4.3.2.

Proactive infrastructure planning can help improve market certainty and investment staging by signalling needs well in advance. Assuming an "infrastructure needs assessment" is supported/adopted by Government, a long-term pipeline can give businesses confidence to take on apprentices and invest in equipment, leading to higher capability and productivity. Decision-makers can also take advantage of stimulatory and countercyclical investment opportunities to improve staging by smoothing delivery through peaks and troughs.

b. Co-ordination of infrastructure projects across different sectors and agencies

Stakeholders noted that there are opportunities for Te Waihanga to use its understanding and oversight of cross sector patterns to improve the co-ordination of infrastructure projects.

Waka Kotahi noted that they use a bottom-up approach for identifying projects/programmes for the National Land Transport Fund, that is, identifying proposals locally, then prioritising proposals taking into account budget constraints. This approach supports the Government Policy Statement for Land Transport and the Transport Minister's Policy direction, but may not integrate with or support other sector or cross-sector strategies. So, coordination is important to ensure that all infrastructure sectors are performing well for New Zealanders.

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[27] https://www.oecd-ilibrary.org/docserver/95c2cef2-en.pdf?expires=1691892516&id=id&accname=guest&checksum=AF6F4053FD06ECA7CC99BD77A3688F22

[28] *The infrastructure Strategy* identifies Aotearoa's high-level infrastructure needs/ problems

Te Waihanga can help co-ordinate infrastructure needs and projects through the IPL by:

- considering other relevant agency or sector strategies when assessing projects,
- connecting organisations early in the development of cross sector/agency projects,
- signalling key project constraints via the IPL, for example, "project benefits are constrained by land-use settings and existing water service capacity".

Lessons from other evaluation/prioritisation processes

a. Assessing infrastructure programmes

Stakeholders suggested that the IPL should consider infrastructure programmes as well as projects. This is to capture programme investments that may not pass a "capital cost threshold" at the project level but would at the programme level (see Section 4.4.1).

Assessing programmes in the IPL would mean that a group of smaller projects (that sit under a wider programme/objective) could still be considered nationally significant infrastructure. Waka Kotahi and MoE noted that many of their infrastructure proposals (particularly for asset improvement activities) are at the programmes. MoE and Auckland Council also noted that they would likely be constrained by any capital cost threshold. Their point of engagement with the IPL would likely be at the programme level.

Infrastructure Australia includes programmes on its IPL (e.g., the Northern Territory remote community power generation program, and the New South Wales social housing program).

Treasury-specific insights

a. The IPL should minimise additional administrative burden for agencies and integrate into New Zealand's IMS

Treasury noted that the initial design of the IPL Assessment Framework integrates well with New Zealand's existing IMS. For example, the Assessment Stages were based on Treasury's Better Business Case, and the Assessment Processes were designed considering information that we can reasonably expect from key investment documents (i.e., Risk Profile Assessments (RPAs), [29] Strategic Assessments, [30] and Business Cases). Our full advice on the Assessment Framework's Stages and Processes is outlined in Section 4.

Treasury also noted that there may be an opportunity to use outputs from the IPL's Assessment Framework in IMS processes. This could increase Te Waihanga's influence on infrastructure decision-making compared to the status quo but will depend upon the outcome of ongoing discussions regarding the integration of the IPL into the IMS.

[29] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/think-investment-possibilities/risk-profile-assessment

[30] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/better-business-cases-bbc/bbc-guidance/strategic-assessment

The Risk Profile Assessment is being updated, and Treasury will provide a quarterly report to the Miniter of Finance on new investments. These quarterly reports will include an assessment on whether investments should progress to the business case stage, and could include information on if investments align with *The Infrastructure Strategy* and/or if investments are on the IPL. This means Te Waihanga's advice could help filter out unsuitable investments or promote good investments early in the process. The Minister of Finance will report to Cabinet on new investments in the quarterly reports. Section 3.6 provides more detail on the IMS.

3.5. High-level design details informed by the New Zealand context

Table 15 outlines how insights from the New Zealand context has informed the design of the IPL's Assessment Framework (see Sections 4 and 5).

As shown below, one of these key insights was common across our gap analysis and our stakeholder engagement process – **identifying Aotearoa's long-term infrastructure needs.**

TABLE 15: APPLYING THE ASSESSMENT FRAMEWORK IN THE NEW ZEALAND CONTEXT

Key insights/gaps	**Possible implication on design of the Assessment Framework**
Identified via gap analysis **and** stakeholder engagements	
Infrastructure long-term needs/problem identification	• Te Waihanga develops an appropriate evidence base to identify long-term infrastructure needs/problems • These long-term needs then undergo the same assessment process as all other early-stage projects, and if successful, are included on the IPL (noting that they need a proponent) • A detailed pathway for Aotearoa's infrastructure needs is developed
Identified via gap analysis	
Public transparency of decision making	• Publicly release information on infrastructure project assessments and how they were assessed • Use the Official Information Act 1982 as guidance to ensure that certain information is withheld (e.g., commercially sensitive information, information that would decrease the negotiating power of the Government, legally privileged information etc).[31] • Provide meaningful feedback to proponents, particularly if projects do not make the list (e.g., how can the project make the list, or let proponents know if the project is out of scope/not appropriate)

[31] https://www.legislation.govt.nz/act/public/1982/0156/latest/DLM65371.html

Ability to make trade-offs across infrastructure portfolio	• The Assessment Framework should be general enough to assess all types of infrastructure – even projects that would not typically be provided or funded by central government • Do not use "infrastructure sector" as a filter for assessments
Strategic alignment with *The Strategy*	• Create a bespoke process and/or methodology to assess the strategic alignment of proposals against the five objectives in *The Strategy*
Technical guidance	• Build flexibility into the Assessment Framework so that over time it can be updated to accommodate new technical guidance and/or sector specific guidance • Te Waihanga will be able to identify common weaknesses and strengths of proposals over time (given a critical mass of submissions). As such, Te Waihanga has an opportunity to provide guidance (sector or methodology specific) where there are clear gaps
Identified via stakeholder engagements	
Co-ordination across sectors and agencies	• The Assessment Framework has a built-in mechanism that considers other relevant agency or sector strategies in project assessment • Te Waihanga should establish strong communication/feedback channels with proponents to connect organisations early in the development of cross sector/agency projects, and • The IPL could signal key project constraints in the publicised assessment summary (e.g., this project's benefits are constrained by land-use settings and a lack of water service capacity)
Assess infrastructure programmes as well as projects	• Programme Business Cases (PBCs) do not usually have detailed cost-benefit-analyses, schedules, financials or specific procurement information. PBCs can be supplemented with individual Business Cases (for a project, or a tranche or projects) to assess programmes.[32] • Programmes could be assessed as a whole in the early-stage. This aligns well with the high-level nature of the RPA, Strategic Assessment, and PBC documentation in New Zealand. Infrastructure Australia **only** publishes Programmes as a whole in Stage 1 (no project-level details - e.g., NSW social housing programme). • In subsequent stages, programmes could be assessed by individual business cases (for a project, or tranche of projects) and/or by Activity Management Plans, with individual projects published on the IPL under a wider programme heading.

[32] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/better-business-cases-bbc/programme-business-case

Minimise administrative burden	• Submission requirements are based on existing documentation and templates
Integrate IPL into New Zealand's IMS	• Integrate the IPL into an existing process (e.g., Quarterly Investment Reporting) to quickly garner a critical mass of submissions/projects • New Zealand's Better Business Cases model is the starting point for the IPL assessment stages

3.6. Improvements to the IMS

Treasury is currently leading a work programme on strengthening the IMS. To date, Treasury has established a Quarterly Investment Reporting process, updated the Budget Evaluation Framework, and has conducted a review of CO(19)6.[33] During our stakeholder engagement meeting, Treasury also signalled further improvements.

The Risk Profile Assessment is being updated, and Treasury will provide a quarterly report to the Minister of Finance on new investments. These quarterly reports will include an assessment on whether investments should progress to the business case stage. This means the RPA will be a stop/go point that helps filter out unsuitable investments earlier in the investment process. The Minister of Finance will report to Cabinet on new investments in the quarterly reports.

The Gateway review process and Strategic Assessments are also being updated. For example, Gateway reviews will be shared with Cabinet, and Strategic Assessments will have more of a focus on providing high-quality feedback/recommendations to agencies.

Table 16 shows that Treasury's processes have a material influence on the design of the IPL's Assessment Framework. This mainly stems from the fact that Te Waihanga does not have a mandate to require submissions from proponents. **Without a mandate, integrating the IPL into New Zealand's IMS and minimising administrative burden are critical design features for the IPL's success.**

We recommend that Te Waihanga review the contents and recommendations in this report against upcoming changes to the IMS to ensure that the Assessment Framework still satisfies these two criteria.

TABLE 16: INFLUENCE OF TREASURY PROCESSES ON THE DESIGN OF THE IPL

Assumptions	Implications on design
Te Waihanga does not have a	**Low barrier to submission -** Submission requirements are based on existing documentation and templates. As such, many assessment

[33] Options for progressing an Infrastructure Priority List (Te Waihanga supplied report)

Assumptions	Implications on design
mandate that it can use to require submissions from proponents.	criterions are directly informed by information that is gathered under current Treasury processes.
	The IPL Assessment Framework should align with existing processes. As such, New Zealand's Better Business Cases model is the starting point for the IPL assessment stages.
	Te Waihanga will need to integrate the IPL into an existing process (e.g., Quarterly Investment Reporting) to garner a critical mass of submissions/projects in a short period.

4. Assessment Stages and Processes

4.1. Scope of Deliverable 2

Te Waihanga sought written advice on:

- Assessment Stages; and
- Assessment Processes (for each stage).

This advice should consider Te Waihanga's existing initial concept for the assessment framework, outcomes from Deliverable 1, our previous experience in the operation of infrastructure investment assessment processes, and a review of other relevant information, such as the New Zealand Infrastructure Strategy or guidance published by the New Zealand Treasury. The assessment stages and processes should be:

- Aligned with the Infrastructure Strategy;
- Consistent with international best practice;
- Feasible to implement based on information that we can expect to obtain for public infrastructure proposals (for instance, drawing on information that should be in project business cases); and
- Applicable across different types of projects (e.g., renewal projects as well as new infrastructure) and different asset classes (e.g., hospitals as well as roads).

4.2. Assumptions and implications

4.2.1. Key assumptions based on earlier findings

We have developed our advice based on several key assumptions, which we have discussed with Te Waihanga. These are summarised in Table 17.

TABLE 17: SUMMARY OF KEY ASSUMPTIONS

Key assumption	Description
Te Waihanga objectives for the IPL	Through our engagement with Te Waihanga, we understand that key objectives for the IPL include: • Prioritising and providing the public with transparency on nationally significant projects for New Zealand; • Identifying long-term infrastructure needs that extend beyond immediate budget decisions; and • Lifting the quality and minimum standard for business cases and projects.
Mandate for assessment	At this point in time, Te Waihanga does not have a mandate to require submissions from proponents. Instead, all submissions to the IPL will be voluntary. This is explained further in Section 4.2.2
IPL delivery timeframe	The IPL needs to be delivered by 2026 but the list and assessment framework can continue to evolve over time.
Role in the investment system	The IPL will be part of an existing investment management system and should aim to minimise duplication with existing processes/systems where possible.

4.2.2. Te Waihanga's mandate for IPL assessments

A common feature of the case studies we assessed (see Section 2) was a government-mandated mechanism for infrastructure project assessments. This is shown below in Table 18.

TABLE 18: INTERNATIONAL MANDATED MECHANISMS

Case study	Mandated mechanism for assessment
Infrastructure Australia	Infrastructure projects seeking or receiving more than $250m AUD in Australian Government funding must have a business case evaluated by Infrastructure Australia (Australian Government legislation).
Infrastructure NSW	Infrastructure projects with an estimated total cost of $10m AUD or over are subject to the INSW assurance process (NSW Treasury policy).
Chile	Ministry of Social Development is responsible for evaluating investment initiatives that request financing from the State (Chilean legislation).
Korea	Ministry of Social Development is responsible for evaluating investment initiatives that request financing from the State (Chilean legislation).

Te Waihanga has the mandate to be consulted on the procurement of some infrastructure projects. Rule 64 of the Government Procurement Rules states that agencies considering the

procurement of infrastructure with a total cost ownership of more than $50m must (among other things):

- consult with Te Waihanga early in the development of the project's business case,
- involve Te Waihanga in the assessment of the project's business case.[34, 35]

At this stage, Te Waihanga does not have a mandated mechanism for IPL assessments. As such, submissions to the IPL will need to be voluntary until there is a mandate, or until the IPL is integrated into an existing process. This presents a few risks:

- The IPL may not achieve a critical mass of submissions that makes it meaningful. As such, the IPL's completeness, influence, and currency may be compromised.
- We may need to simplify the IPL's assessment process to minimise any extra effort required by proponents.
- The lack of a mandate may limit opportunities for Te Waihanga to seek additional information from proponents or lift the standard of submissions.

4.2.3. Key implications of our assumptions on the Assessment Framework's Stages and Processes

Based on the key assumptions identified above, we identified several characteristics for the assessment framework and examples of what these could look like in practice (see Table 19).

TABLE 19: KEY DESIGN CONSIDERATIONS FOR STAGES AND PROCESSES

Characteristic	What this could look like in practice…
Minimise barriers to assessment (i.e., submission requirements)	Submission requirements are based on existing documentation/templates/guidance as far as possible
	Proponents can submit proposals whenever it is convenient for them
	Proponents can easily understand how to make a submission, what is required, and how it will be assessed through the IPL
Align with existing processes as much as possible	New Zealand Treasury's Better Business Cases model is the starting point for assessment stages
	Te Waihanga works with government to understand how existing processes (e.g., Quarterly Investment Reporting) can be used as an optional trigger for its assessment

[34] https://www.procurement.govt.nz/assets/procurement-property/documents/government-procurement-rules.pdf

[35] CO(19)6 also outlines that Te Waihanga must be consulted on projects with a whole-of-life cost more than $50m and/or agencies considering innovative approaches to procurement.

Characteristic	What this could look like in practice…
	Te Waihanga receives and/or has access to key information (e.g., RPA, Strategic Assessments, Business Cases) for assessment
Maximise status and public visibility from positive assessments	Assessment outputs are simple and easy to understand
	Te Waihanga identifies opportunities to use the assessment outputs to inform decision making and public perceptions
	Assessments focus on the strengths of projects and only raise weaknesses where these are material. Where appropriate, Te Waihanga should provide advice on addressing or strengthening these weaknesses
Minimise risk/backlash to proponents from a negative assessment	The assessment process provides sufficient opportunities for proponents to address submission issues that are identified by Te Waihanga, prior to an assessment being finalised
	Negative assessment outputs are more concise than positive assessment outputs, and potentially published through a different avenue (e.g., an annual list of submissions that were assessed but not added to the priority list at this time)
	All public assessment outputs limit critique to core project issues (e.g., cost risks) as these are more clearly in the public interest. Process issues (e.g., business case quality) are communicated to proponents through direct feedback
Enable the IPL to quickly achieve a critical mass of listings	The level of effort required to pass the assessment criteria (e.g., demonstrating strategic alignment) is initially less onerous, then developed further over time
	Te Waihanga actively identifies ideal submissions for the priority list and engages with proponents to encourage them to submit these. Where submissions are not made, Te Waihanga considers adding them to the list as an independent entry
	Te Waihanga plans for a longer initial submission and assessment period, where a greater volume of submissions can be collected and assessed before a major first publication
Allow for Te Waihanga to independently identify long-term infrastructure needs	Te Waihanga finds or develops an appropriate evidence base to assess long-term infrastructure needs across all sectors
	These independent items still undergo the same assessment process and if successful, are included on the priority list noting that they still need a proponent

Characteristic	What this could look like in practice…
Include best practice guidance that can evolve into requirements in the future	The assessment framework clearly identifies what is mandatory and what is recommended
	In consultation with industry and government, Te Waihanga identifies where best practice guidance will evolve into mandatory requirements in advance (e.g., 1-2 years' advance notice).

4.3. Identifying options for the Assessment Stages

4.3.1. Review of current Better Business Cases (BBC) Stages

We reviewed the existing Better Business Cases stages to understand their relative strengths and weaknesses. This was from the perspective of using these as stages for the assessment framework. Our findings are summarised in Table 20.

TABLE 20: HIGH-LEVEL REVIEW OF BETTER BUSINESS CASES STAGES

	Risk profile assessment/strategic assessment	Indicative/ Programme Business Case	Detailed Business Case
Strengths	• Better visibility of longer term needs • Higher potential volume of submissions • Greater opportunity to influence option identification	• Required to include a range of options • Projects are less likely to be funded or committed • Some opportunity to influence option selection	• Highest quality of evidence • Detailed cost-benefit analysis should have been completed
Limitations	• Limited information and evidence, which increases uncertainty • Existing templates may overly focus on solutions rather than underlying problems and opportunities • Greater risk of prioritising a project that turns out poorly	• Projects likely still near/medium term focused • Cost-benefit analysis may not be consistently used across all submissions • Limited opportunity to request new options for assessment or consideration	• Projects may already be funded or committed • Risk for proponents of negative review is highest • Value of public status on the IPL at this stage may be lower • Projects likely focused on immediate needs

There are a range of strengths and limitations against each assessment stage. Generally, these revolve around the balance between early influence and project maturity, which was a key trade-off identified from the case studies. Including all three existing stages in the framework can somewhat mitigate the limitations, but these challenges are still likely to exist when assessing any given proposal at each of the three stages. In our advice, we have considered

opportunities to mitigate these limitations and to make best use of the strengths at each stage.

4.3.2. Considering stages before and beyond the BBC

Te Waihanga sought advice on the potential merit of pre-Stage 1 (i.e., broader sector/regional infrastructure needs) and post-stage 4 (i.e., post-implementation reviews) analysis.

Pre-Stage 1 (broader sector/regional infrastructure needs)

Accessing an evidence base on broader sectoral and regional infrastructure needs would enable Te Waihanga to:

- identify longer-term needs or opportunities that need highlighting on the priority list;
- have an evidence base that can be used to assess submissions against; and
- have a core set of data and scenarios that can be used to maintain assessments consistency.

This evidence base could be developed by Te Waihanga or be an amalgamation of existing analysis undertaken by industry and/or government. Given its role as a 'source of truth' to test submissions against, this work is best suited as a separate Te Waihanga workstream, not as a 'stage' in the priority list. This will enable it to have its own development process, consultation path and potentially update frequency. This is the approach used by Infrastructure Australia and the Australian Infrastructure Audit.

FIGURE 2: AUSTRALIAN INFRASTRUCTURE AUDIT

The **Australian Infrastructure Audit** is produced approximately every five years by Infrastructure Australia to strategically audit the country's nationally significant infrastructure. The Australian Infrastructure Audit 2019 identified major challenges and opportunities across the transport, social infrastructure, energy, telecommunications, and water sectors. The evidence in the Audit underpins Infrastructure Australia's other major publications: 15-year rolling infrastructure plans and the Infrastructure Priority List.

Post-stage 4 (post-completion reviews)

Post-completion reviews can provide valuable insight into project outcomes and lessons that can then be applied to current and future projects. This activity is focused on project assurance, as opposed to project prioritisation.

Our case study reviews found that, without a strong mandate, it is very difficult to encourage submissions for post-completion reviews. Proponents often view post-completion reviews or benefits realisation activities as a large risk, particularly if outcomes will be published.

In the future, as the priority list reaches critical mass and public recognition, there could be an opportunity for Te Waihanga to add a post-completion review stage. Alternatively, this could

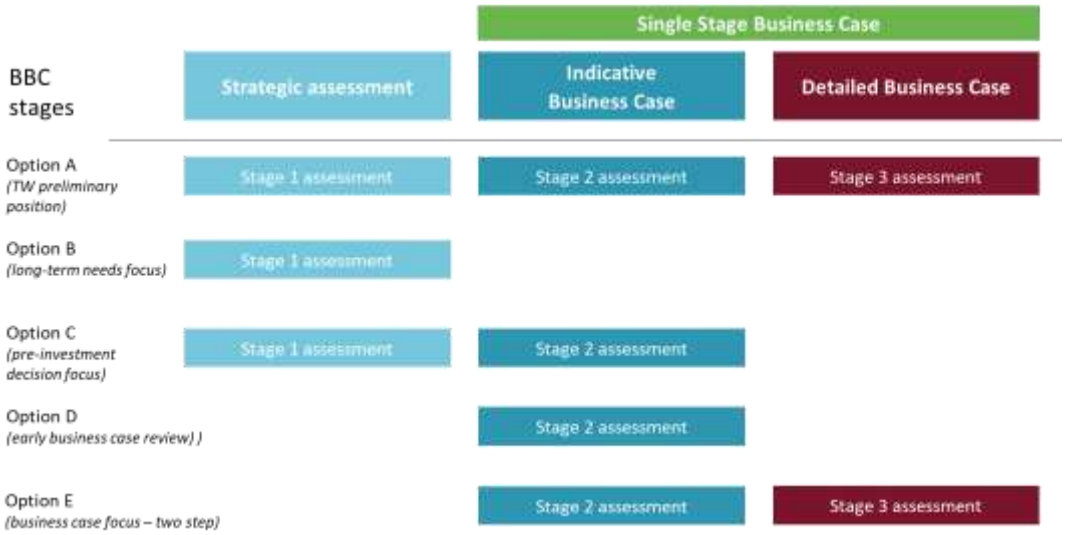
be a separate activity that is pursued (e.g., a funding envelope is secured to undertake a certain number of post-completion reviews in partnership with proponents).

4.3.3. Long-list of options for Assessment Stages

Our analysis found the assessment framework should align with the three existing Better Business Cases stages. This follows from Te Waihanga's preliminary planning. Te Waihanga also sought our advice on different choices of the three stages, and what their relative merits or limitations may be.

We have developed five longlist options for assessment stages, which are shown in Figure 3.

FIGURE 3: OPTIONS FOR ASSESSMENT FRAMEWORK STAGES



The five longlist options allow Te Waihanga to consider different focus areas for the assessment framework and the priority list.

Option A (comprehensive review focus) covers all three stages of the Better Business Cases framework. We expect the majority of submissions would be for Stage 1, followed by Stage 2. This gives Te Waihanga the opportunity to assess and identify longer-infrastructure needs, as well as to undertake more detailed assessments of proposals seeking funding.

Covering all three stages aligns very closely with objectives for the priority list (see Section 2.3.1). There is a risk that it will be viewed as duplicative with existing processes and it will also be the most resource-intensive option for Te Waihanga in terms of assessment costs.

Option B (long-term focus) would only assess Stage 1 submissions from proponents, enabling a greater focus on long-term infrastructure needs. Items on the priority list will be at a similar stage of development, compared with a priority list that includes long-term needs and investment ready proposals. The greatest challenge with this option is the low level of evidence available in Risk Profile Assessment / Strategic Assessment submissions. There is also

a risk that if proposals are too high level, the priority list may be difficult for government to respond to and therefore perceived as inconsequential.

Option C (pre-investment decision focus) focuses on Stages 1 and 2, which will help expand on the long-term infrastructure needs to also include indicative/program business cases. Projects at Stage 2 are likely to not yet have received funding. This is an opportunity for the priority list to influence budget decisions. However, without assessing Stage 3 business cases, there is a risk that government makes funding decisions on detailed business cases without consulting the priority list.

Option D (early business case review) focuses entirely on Stage 2. This is potentially the stage where Te Waihanga can have the most influence on projects that are actively being developed and considered for funding. However, it will be difficult for the priority list to fulfil the objective of identifying longer-term infrastructure needs. There may also be a limited number of submissions when only focusing on Stage 2.

Option E (Business case focus) would involve Stages 2 and 3, which will provide the greatest level of evidence on projects for Te Waihanga to assess. This will enable rigorous reviews and high-quality advice to government on infrastructure priorities, but mostly in the immediate to near-term. It may also be perceived as duplicating existing assurance processes.

4.3.4. Short-list of stage options

Of the longlist options identified, Option A (Stages 1 + 2 + 3) and Option C (Stages 1 + 2) align most closely with Te Waihanga's objectives for the priority list. Stage 1 is critical to identifying longer-term infrastructure needs, while Stage 2 is where the priority list can most strongly influence project development and funding decisions, as well as provide transparency to the public on infrastructure decision making. The difference between these options is whether or not to include Stage 3. A Stage 3 assessment can provide the government and the public high-quality advice and transparency on project funding decisions.

These submissions will have the greatest level of information for assessment and the greatest level of maturity. However, this also means that proponents may perceive a Stage 3 assessment as high risk and be cautious about providing a submission (particularly if there are existing project commitments or in principle funding agreements). As a result, the number of Stage 3 submissions may be low, particularly while the priority list is still growing in status. The effort and resources required for a Stage 3 assessment are also likely to be high and there is a risk of duplication with existing assurance processes.

4.3.5. Recommendation

We recommend Option A (Stages 1 + 2 + 3) as the preferred approach for assessment stages but note that there are risks and limitations of stage 3 that will need to be closely managed. While there may be challenges with reviewing detailed business cases, we consider that the priority list can play an important role in providing advice to government and the public on investment-ready proposals.

We also note that **this option could be pursued over time, with Option C (Stages 1 + 2) an incremental first step.** Through the assessment processes and methodologies work, we have considered the potential challenges and risks for stage 3 assessments and how these can be mitigated.

4.4. Building an Assessment Process based on the recommended Stages

We developed a comprehensive assessment process for the three assessment stages identified we set out in the previous section. We developed these processes based on our previous first-hand experience with assessment processes at Infrastructure Australia and Infrastructure NSW, as well as our findings from the other international case studies. Throughout the development phase, we have engaged with Te Waihanga to test, refine and strengthen the assessment processes.

We recommend creating consistent steps in each assessment stage to help keep the framework easy to implement and easy to understand by proponents and Te Waihanga. Our proposed key steps are illustrated in Figure 4.

FIGURE 4: KEY ASSESSMENT PROCESS STEPS IN EACH STAGE

The following sub-sections describe these key steps and how they apply at each stage. This should be read alongside the detailed recommended process map for each stage, which is available in Appendix B.

4.4.1. Triage: What projects should Te Waihanga assess?

The purpose of the triage step is to filter out submissions that do not warrant a full assessment. This helps ensure that Te Waihanga is using its assessment resources efficiently, and that proponents find out sooner if their submission is not taken forward to assessment and why.

At Stage 1, the triage step considers the following key questions in sequence (that is, a 'no' result leads to a submission being triaged out. This is shown below in Table 21.

TABLE 21: TRIAGE QUESTIONS FOR STAGE 1

Triage question	Description
Is there sufficient information?	Te Waihanga should publish clear guidance on the information requirements for Stage 1 submissions. Initially, we expect this would be the Risk Profile Assessment/Strategic Assessment requirements, but this could grow over time as appropriate.
Does the submission directly relate to infrastructure or avoiding the need for future infrastructure spending?	We understand that Te Waihanga wishes to consider submissions from all sectors, which will help build critical mass on the IPL early. Therefore, the triage question focuses on whether the submission is directly for infrastructure or would avoid the need for future infrastructure spending (e.g., a demand management solution).
Are the whole-of-life costs of the proposal likely to exceed a capital cost threshold? OR Could the proposal make a material contribution to the recommendations or objectives in *The Strategy*?	We recommend that Te Waihanga develop a low whole-of-life cost threshold. This is not a 'national significance' threshold, but a cost threshold that helps steer away submission for small, localised infrastructure projects that have no likelihood of being included on the priority list. Recognising that an infrastructure-related submission could have low whole-of-life costs but far greater benefits, there is an additional avenue in this triage question. If a proposal could make a material contribution to the recommendations or objectives in the New Zealand Infrastructure Strategy, it should pass the triage.

To develop this set of triage questions, we drew on our case study experience and workshopped a series of potential triage questions with Te Waihanga. Two other key triage questions considered were:

- **Is a certain threshold of crown funding sought?** This was not included as crown funding is not necessarily an indicator or requirement of nationally significant infrastructure needs for New Zealand, particularly as more innovative funding solutions become explored for projects.
- **Has the cost of the problem or opportunity been monetised?** This was not included as this type of analysis is very unlikely to be available for Stage 1 submissions (see Figure 5).

FIGURE 5: NATIONAL SIGNIFICANCE THRESHOLD

Infrastructure Australia adopts a national significance threshold for assessing submissions, based on analysis of the economic, social, and environmental costs of the underlying problem or opportunity. This is a highly quantitative and rigorous approach to problem and opportunity analysis. From a triage perspective, Infrastructure Australia considers whether a submission has monetised these costs.

Risk profile assessment and strategic assessment templates do not require this level of analysis, so it will not be feasible to require this information without adding a significant burden for proponents. This could be pursued in the future by first releasing guidance and building up business case practices, before making it a mandatory threshold.

Across our proposed triage questions, there is inevitably some level of subjectivity. There may also be instances where Te Waihanga uses its own insight/research to address a question, such as potential whole-of-life costs. To manage this, the focus of triage should be on filtering out submissions that have little to no likelihood of success under a full assessment. In cases of doubt or uncertainty, we recommend allowing a submission to pass triage (particularly in the initial phases of the priority list, to help build critical mass). Secondly, triage reviews and recommendations should be compared across submissions to help encourage a consistent approach.

Our proposed assessment framework also allows Te Waihanga to self-nominate items for the priority list, to fill gaps in long-term infrastructure needs or opportunities that are not covered by general submissions. These self-nominated proposals should also undergo the same triage process to ensure they should be assessed, and to ensure consistency across all items promoted on the priority list.[36]

4.4.2. Assessment criteria: How should projects be assessed?

Selecting the right criteria

We understand that Te Waihanga's initial thinking for assessments has been around **strategic alignment and value for money**. We have reviewed this approach against the case study findings, our own experience with similar frameworks and the priority list objectives.

The case study research showed different approaches and criteria are used internationally to assess and prioritise projects. However, within each framework, strategic alignment and value-for-money were considered and core parts of the assessment. Assessing strategic alignment was more consistent across case studies, with the focus being on considering alignment with government policies and plans. In some cases, broader stakeholder impacts and integration with existing infrastructure systems/networks were assessed.

[36] These proposal may require independent scrutiny.

Value-for-money assessments typically involved cost-benefit analysis, but often also considered other factors such as the impact on sustainability, resilience impacts, quality of life, employment and more. There is a strong basis for including strategic alignment and value for money as criteria and these closely align with the objectives for the priority list.

We also identified that many of the case studies assessed the deliverability of projects, which effectively considers the risk of them being able to achieve their strategic intent and potential value for money.

For Infrastructure Australia, deliverability is a standalone criterion, while for Infrastructure NSW, four of their seven key focus areas relate to deliverability. These areas are governance, risk management, stakeholder management and asset owner's needs and change management.

Poor deliverability will impact on strategic alignment and value for money outcomes, for example through poor integration with existing systems or infrastructure networks, project delays, cost overruns, poor management of scope and more. While these aspects could be considered as part of strategic alignment and value-for-money tests, we recommend a standalone criterion for the following reasons:

- Explicitly assessing and identifying deliverability issues reduces the risk Te Waihanga recommends a project that has poor deliverability outcomes. This goes against the objectives for the IPL and introduces reputational risk for Te Waihanga and the IPL;
- The responses and mitigations for poor deliverability are typically different to poor value for money or strategic alignment, so separating these out will more clearly identify a proposal's strengths and weaknesses, and how they can be addressed;
- Forecasting the impact of poor deliverability on strategic alignment and value for money outcomes ex-ante is extremely difficult and uncertain; and
- A standalone criterion for deliverability aligns with Te Waihanga's initial planning for the focus/intensity of criteria to shift over the assessment stages, with a much greater focus on deliverability at the third stage.

The following sections describe the assessment processes for each criterion at each stage. These should be read alongside the process diagrams in Appendix B, which differentiate between mandatory and non-mandatory questions in the process.

Mandatory and non-mandatory questions are defined in Figure 6.

FIGURE 6: MANDATORY AND NON-MANDATORY PROCESS QUESTIONS

In our recommended assessment processes in Appendix B, we have differentiated between mandatory and non-mandatory questions.

Mandatory questions are criteria the proposal must pass to be included on the priority list. We consider these are minimum criteria the assessment framework should hold. These questions are often asked in sequence, where a 'no' result would lead to a proposal not passing the relevant criterion.

Non-mandatory questions are the areas that are good or best practice, but we recommend not yet requiring a 'yes' or positive response to for the initial assessment framework. These assessment areas contribute to overall scoring, but are not a threshold matter. To lift the standard of proposals and decision making, over time, Te Waihanga may wish to make previously non-mandatory questions, mandatory.

Strategic alignment

Strategic alignment tests the extent to which a proposal fits within and supports future infrastructure priorities and the existing infrastructure systems and networks that are in place.

At Stage 1, we include mandatory questions on problem definition, alignment with the New Zealand Infrastructure Strategy, and whether the proposal is nationally significant (i.e., is it of a scale or importance for a national infrastructure priority list). We see these questions as critical areas that a proposal must address. These are followed by non-mandatory questions around alignment with other government policies/strategies, stakeholder impacts and whether problem/opportunities costs have been monetised (see Figure 7).

The overall performance of the proposal against both the mandatory and non-mandatory questions would dictate the strategic alignment rating (note scoring approaches are discussed in section 4.4.5).

FIGURE 7: PROBLEM AND OPPORTUNITY MONETISATION

Problem and opportunity monetisation refers to measuring the economic, social, and environmental costs associated with a problem, or values associated with an opportunity. This practice is required in the Infrastructure Australia Assessment Framework to test proposals against their national significance threshold.

This type of analysis means that proponents need to undertake detailed problem or opportunity analysis on quantitative data. Importantly, it shows the scale of different problems and opportunities and how these change over time, which can be used to consider what scale/type of solutions may be appropriate. It is also a step towards developing the base case in a cost-benefit analysis.

This practice can be highly rigorous, but is information and data intensive, and not often undertaken in business cases or business cases for early-stage proposals.

At Stage 2, the assessment process shifts towards understanding the potential impact of a proposal on strategic objectives. We have proposed a mandatory question around the impact of proposals on Te Waihanga's strategic objectives, and non-mandatory questions around impacts on key government policies/strategies and stakeholders.

At Stage 3, the focus of the assessment is on whether the project still aligns with strategic objectives, and developing a better understanding of what this impact will be. There are also non-mandatory questions around key government policies/strategies, stakeholder support and integration with existing infrastructure networks and systems.

The methodologies applied during these processes are discussed in Section 5.

Value for money

Value for money tests the extent to which a proposal provides value to society over the costs required to deliver, operate, and maintain it.

At Stage 1, the value for money assessment process focuses on whether a suitable range of options have been identified and if there is likely to be a value for money solution to the problem/opportunity that has been identified. As mandatory questions, the assessment process steps through three broad option types:

- Reform options (across policy, governance, regulation responses and more);
- Better use of existing asset options; and
- New capital investment options.

The assessment process involves testing whether these option types apply, and if so, whether the proponent has identified an appropriate range of them in the submission. An 'appropriate' range should consider what responsibilities/control a proponent has (e.g., some reform options need to be considered at a national level, so may not feasibly be explored as solutions to a localised issue).

If the proponent has not included an appropriate range of options where they should have, they do not pass the value for money assessment. However, we have flagged this an optional pathway, particularly for the initial phase of the priority list. Even if a proponent has not identified all relevant options, if there is still an option that is likely to provide a value for money solution, Te Waihanga may still want to positively assess this proposal. This would support achieving critical mass early on the priority list without compromising on the infrastructure priorities that are being published.

At Stage 2, the assessment process involves mandatory questions on whether longlist options have been filtered appropriately, whether short list options have been developed sufficiently, if the proposals are assessed using an appropriate methodology and whether at least one of the final options (i.e., those proceeding to the detailed business case) are likely to provide value for money (see Figure 8).

There are also non-mandatory questions that should inform the overall value for money rating, but are not critical for the assessment. These cover areas such as how resilient the

value for money rating is to different scenarios, how thoroughly a range of benefits have been quantified and how many options are being taken forward for further assessment.

FIGURE 8: ABSOLUTE VS. RELATIVE VALUE FOR MONEY

We understand that value for money and efficiency are key considerations for Te Waihanga and the assessment framework.

In most cases, we recommend using an absolute value for money threshold (i.e., testing if the benefits of a project outweigh its costs). Section 5 of this report describes the specific methodologies that are available. We recognise each methodology has limitations..

In some cases, relative value for money may need to be considered where there are no other feasible options available, but a strong strategic case exists. This can be the case for providing critical infrastructure or minimum service standards to rural or remote populations. In these cases, we recommend requiring proponents to demonstrate that a wide range of options have been considered and that as many benefits as practical have been quantified. Cost-benefit analysis can still provide useful information on the gap between benefits and costs to achieve the relevant strategic objectives.

At Stage 3, the assessment process includes mandatory questions on whether the preferred option maximises value for money, if whole-of-life costs have been thoroughly considered, and whether the preferred option will provide value for money under a reasonable range of scenarios.

The "reasonable" range of scenarios will depend on the unique characteristics of projects – some may be very sensitive to future climate scenarios, new population growth, user take up or other factors.

In the first instance, we recommend requiring all proponents undertake a standard set of sensitivity tests (i.e., changes to discount rates, changes to costs, and changes to benefits) alongside project-specific sensitivities. Te Waihanga could publish example sensitivities for different sectors and types of projects, but we recommend keeping the onus on proponents to carefully identify, consider, and test sensitivities that are most relevant to their project.

The strength of a proposal against these questions and the non-mandatory questions (benefits management plans, consideration of non-quantified costs and benefits, and funding considerations) would determine the overall value-for-money rating.

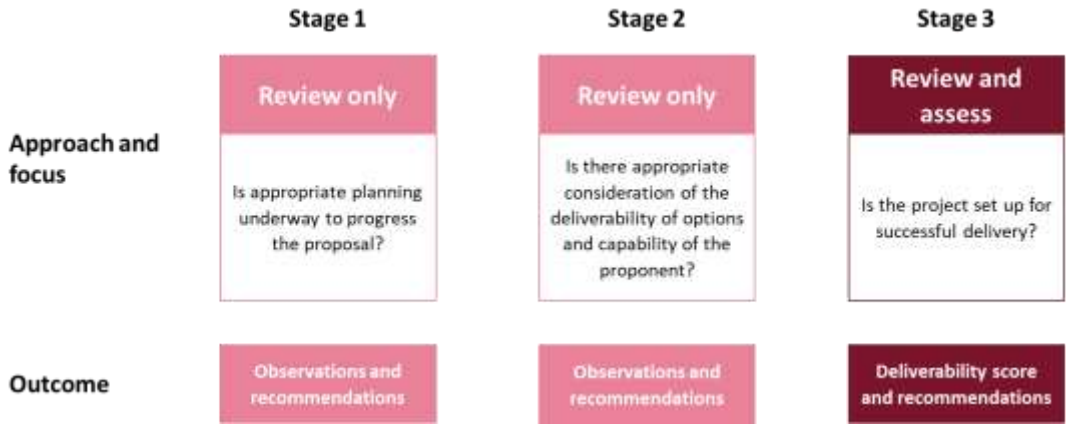
Deliverability

Deliverability tests the extent to which a proposal can be successfully implemented and operated over its life.

Based on the objectives of the priority list and our discussions with Te Waihanga, we recommend including deliverability as a standalone criterion, but with varying application by stage. We recommend including deliverability as a review area in stages 1 and 2, and then as an assessment area in stage 3. This enables to Te Waihanga to review, identify, and make recommendations on the deliverability of early-stage proposals, which can then be addressed or mitigated through project development (i.e., Stages 1 and 2).

By Stage 3, proposals on the priority list should be investment ready, so we recommend applying deliverability as an assessment area for this stage. Figure 9 below summarises this approach, with further detail then provided for each stage.

FIGURE 9: RECOMMENDED APPROACH FOR ASSESSING DELIVERABILITY



Stage 1

At stage 1, the deliverability review focuses on the required planning and critical success factors to progress the proposal (i.e., organisational capability, experience, etc.). The review would not result in a score or rating but instead observations and recommendations from Te Waihanga for the proponent to consider and ideally address as the proposal moves forward. Key questions in the review are around:

- The necessary planning and preparation activities, and whether any of these need to be undertaken now (e.g., corridor protection).
- Engaging with the relevant stakeholders to better understand the problem and potential solutions.
- The critical success factors that will help the proposal move forward.
- Any critical deliverability hurdles that the proposal may encounter that require key consideration.

We have also identified the opportunity for Te Waihanga to work with proponents and government to identify an appropriate owner if the current proponent is not suitable. All review questions are non-mandatory, so the outcomes of the deliverability review would not influence whether it is included on the IPL or not. However, Te Waihanga can use the information gathered in this review to help influence and improve proposal development.

Stage 2

At stage 2, deliverability is still a review area only, focusing on the topics of governance, risk, capability building, delivery strategy, asset ownership, stakeholder management, sustainability, and resilience. At this stage, submissions will be on a shortlist of options that will still require further development, so the review does not aim to determine if options are deliverable or not. Instead, the review should consider if these factors are being considered across all options and how they might inform the preferred solution.

As per stage 1, the review would lead to observations and recommendations that can help improve project development.

Stage 3

At stage 3, deliverability would be an assessment area that results in a rating and influences whether a project passes this stage or not. The intent is to determine if the project is set up for successful delivery.

This requires using a comprehensive set of deliverability questions across project maturity, delivery strategy, delivery expertise, risk management, governance structure, commercial structure, sustainability, and resilience in design, change management and stakeholder management.

We have posed each question as a minimum threshold for being an investment-ready proposal, though the deliverability rating should consider where proposals exceed this standard and incorporate best practice. There are also non-mandatory questions on lessons learnt, current market capacity and funding/financing. These are important questions. We consider they should not necessarily be threshold matters for inclusion on the IPL.

A project needs to consider market capacity, this as part of its delivery strategy, risk management and commerciality. If there are significant existing constraints, we consider that Te Waihanga could include the project on the IPL (if it passes the other criteria) and flag market capacity as a challenge and advise on more appropriate timing for delivery.

We recommend considering funding and financing, this as part of the review but not as a mandatory question. In our view, determining (or securing) appropriate funding and financing arrangements is beyond the scope of the IPL and ultimately part of the decision process informed by the IPL. Te Waihanga could review whether the proponent has taken the appropriate steps in identifying and considering different funding and financing options. It would be beneficial to explore this area further with Treasury as part of finalising the framework.

We note that there may be some areas of the project that require further development and would potentially be addressed through an Implementation Business Case. Te Waihanga should aim to determine whether there is sufficient confidence at this stage to recommend the project as an investment-ready project.

4.4.3. The focus of assessments will change between stages

The assessment process maps should reflect the varying level of focus and detail across criteria during each stage. This is conceptualised in Figure 10.

FIGURE 10: EVOLVING FOCUS OF ASSESSMENT STAGES

Strategic alignment is the core focus at Stage 1, but this reduces at each stage to ensuring that the proposal still aligns and, where possible, understanding the scale of contribution towards strategic objectives. This is the opposite for value for money, where the level of focus grows at each stage.

Moving from Stage 1 to 3, the assessment puts more focus on Deliverability. But Deliverability is only used as an assessment criterion (as opposed to a review) in stage 3. Rather than using weightings and making trade-offs between these three important criteria, we have reflected the focus in the process map questions.

This evolving focus reflects the life of a project during planning and the level of evidence available. It also aligns with the objectives for the priority list, where stage 1 has a higher-level focus on future infrastructure needs, and stages 2 and 3 focus on lifting the quality and minimum standard for business cases and projects.

4.4.4. Engaging with proponents during the assessment process

We recommend regular communication and updates to proponents during the assessment process, as far as practical. This helps manage stakeholder expectations, particularly when one submission may be part of a much larger pool being assessed. Beyond regular engagement, we have identified three key engagement points with proponents.

Triage outcome

Proponents should be aware if their proposal has or has not passed triage, with clear feedback provided if their proposal has not passed triage. As far as possible, Te Waihanga should be clear with proponents on whether:

- they should strengthen their proposal and resubmit in the future, or
- if the proposal is unlikely to be suitable for the priority list (that is, it may be an important local infrastructure issue, but not an important national issue).

Seeking further information

For each assessment stage, the process map identifies an opportunity for Te Waihanga to determine if additional information is needed and if it is likely to already exist. During the assessment process, it is likely that Te Waihanga will encounter:

- Gaps where information is missing;
- Areas of uncertainty where clarification is required; and
- Areas where Te Waihanga has a different view on details/evidence in a proposal.

While Te Waihanga needs to have confidence in its final assessment outcomes, Section 4.2.3 identified the need to minimise barriers to submissions and align with existing processes as much as possible.

Te Waihanga should aim to minimise requests for additional information, focusing only on those that are material to the evaluation and where information already exists (i.e., not asking the proponent to undertake new analysis). This will allow proponents the opportunity to strengthen/support their submission without imposing too high of a burden.

Assessment outcomes

We recommend advising proponents of assessment outcomes once finalised, but prior to publication. This 'no surprises' approach helps with maintaining stakeholder relationships and can also enable Te Waihanga to ask proponents to fact check any material that will be published.

We also recommend considering what tailored feedback can be developed for proponents on their submission, across all stages and all assessments. The length and detail of feedback should reflect the submission stage (i.e., far more detailed for stage 3) and identify both strengths and limitations. This feedback can support the objective of lifting business case

standards and provide more targeted and process-focused advice compared with published assessments. This is covered further in Section 4.4.6.

4.4.5. Scoring system approach

The case study research (see Section 3) revealed a wide range of scoring systems that are used internationally, which have different strengths and limitations. These include (ordered from least to most quantitative):

- Qualitative commentary only;
- A traffic light system (red/amber/green);
- A five (or other) point scale; and
- A calculated total score based on individual criteria and weightings.

For this assessment framework, we have considered the objectives for the priority list alongside our hands-on experience with project assessment and scoring systems.

We recommend using a traffic light system for individual assessment criteria and the overall assessment outcome being reflected in a proposal's inclusion (or not) on the priority list. Inclusion on the list would likely be based on a proposal not receiving any red ratings (apart from deliverability in stages 1 and 2).

The strength of this approach is that it balances:

- **Project nuance –** traffic light ratings provide a high-level view of the assessment that can be supplemented with qualitative commentary. Not combining the ratings into a single score avoids the highly subjective task of making trade-offs between strategic alignment, value for money and deliverability, and instead transparently lays out the individual strengths and limitations of a proposal.
- **Project prioritisation –** in addition to being on the priority list, traffic lights across assessment criteria will also highlight projects that perform the most strongly. This could also be supported by Te Waihanga advice on the potential timing for proposals.
- **Ease of communication –** traffic light scores are widely understood and easier to communicate than numeric systems that have less instinctive meaning to stakeholders.

As a traffic light system is a three-point scoring system, the limited range of scores may be its biggest limitation. If a red score for strategic alignment denies a proposal from inclusion on the priority list, then it is effectively a two-point scoring system (amber and green) for those items included on the priority list.

Changing to a four- or more-point system will increase this differentiation, but sacrifice ease of communication and potentially the effectiveness of the priority list. We recommend Te Waihanga continue to consider the relative importance of its objectives around project prioritisation and public transparency before confirming a scoring approach.

4.4.6. Output of assessments

We have identified three key outputs of the assessment process, which are described in the following sub-sections.

Published outputs

The need to maximise status and public visibility from positive assessments was identified in Section 4.2.3 of this report, as it will help grow the status and public perception of the priority list. Accordingly, Te Waihanga should publish summaries of positive assessments, highlighting the strategic importance and potential value of projects, and commenting only on weaknesses where these are material. Where possible, Te Waihanga should recommend how proponents should address these limitations in future project stages.

The level of detail in these summaries should reflect their assessment stage, but also strike a balance between transparency and ease of communication. They should be accessible to a broad audience and easy to understand.

Government advice

We recommend that Te Waihanga engage with government to understand what bespoke advice can be provided into existing (or new) government processes based on the insight and findings from assessments. The case study research found that a strength of the Infrastructure NSW system was its direct influence and engagement with decision makers, and the nature and detail of this advice is likely to be different from published outputs.

Proponent feedback

We recommend that the assessment process also produce feedback to proponents on the quality of their submission. This feedback should be more process-focused and detailed compared to the published assessment outputs, as it will help proponents improve the quality of their future submissions. It should also note high-quality elements of the submission that should be applied to future submissions.

5. Assessment Methodologies

5.1. Scope of Deliverable 3

Te Waihanga sought written advice on assessment methodologies that can be used to implement the Assessment Stages and Processes outlined in Section 4, including methods for assessing:

- **strategic alignment** with or contribution to *The Strategy* and other agency or sector strategies where relevant;
- **value for money** that can apply to different types of proposals across asset classes;
- **deliverability** (in line with our recommendation that deliverability should be a consideration in the Assessment Process); and
- other relevant issues such as equity and distributional impacts.

This advice considers outcomes from Deliverable 2, our previous experience in the operation of infrastructure investment evaluation processes, and a review of other relevant information such as guidance on value for money methodologies. The methodologies should:

- be consistent with international best practice;
- be feasible to implement based on information that we can reasonably expect to obtain for public infrastructure proposals; and
- apply to different types of projects (e.g., renewal projects as well as new infrastructure) and different asset classes (e.g., hospitals as well as roads).

There are also several areas that are outside the scope, including detailed guidance on how to implement these methodologies.

5.2. Building a tool for assessing strategic alignment with *The Infrastructure Strategy*

We have developed a Strategic Alignment Tool for assessing whether proposals are aligned with *The Strategy's* five strategic objectives or with Asset/ Service Management Plans (AMPs).

The five strategic objectives outlined in Section 6 of *The Strategy* are:

1. Enabling a net-zero carbon emissions Aotearoa
2. Supporting towns and regions to flourish
3. Building attractive and inclusive cities
4. Strengthening resilience to shocks and stresses
5. Moving to a circular economy

AMPs provide information on how organisations intend to manage their assets to (1) meet the demand for, or consumption of relevant services; and (2) to maintain service provision levels and standards.[37]

The Local Government Act 2002 (LGA) does not include provisions that require local authorities to have AMPs.[38] The LGA does require "Infrastructure Strategies" which are similar. Local authorities are also expected to ensure prudent stewardship of community resources, including by planning effectively for the future management of its assets.[39] The Act inserts a statement to this effect as a principle, which gives councils flexibility in how they document and plan for asset management.

CO(19)6 also outlines that "agencies must have current asset management plans to inform strategic, tactical, and operational choices".[40] Council long-term plans are also overseen by the Auditor-General.

Despite Cabinet's expectation for agencies to have AMPs, the New Zealand Government does not appear to provide a detailed definition of or best-practice guidance for AMPs. However, international guidance/resources can be accessed through Āpōpō - a subscription-based professional association for New Zealand's infrastructure asset management community. Two important resources in this space include the International Organisation for Standardisation's guidance on asset management systems (ISO 55000, 55001, and 55002) and the International Infrastructure Management Manual.[41, 42]

Te Waihanga may wish to explore the gap in central government Asset Management Plan guidance, either as part of the IPL product or as a separate workstream.

The Strategic Alignment Tool is a standalone product

The Strategic Alignment Tool is a standalone product that can be applied across Stages 1, 2, and 3, and sits under the wider Strategic Alignment process outlined in Section 4.4.2 and in Appendix B (assessment criteria).

Te Waihanga has defined Processes as the steps taken to assess a proposal at any given Stage of the Assessment Framework, including questions that need to be answered to determine strategic alignment. Assessment Methodologies are the tests, metrics, or questions that are applied to proposals at specific Stages in an assessment Process to determine if they meet certain criteria.

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[37] Definition adapted from: https://comcom.govt.nz/__data/assets/pdf_file/0022/61366/Review-of-EDBs-AMP-20-October-2011.pdf

[38] https://www.dia.govt.nz/vwluResources/BLG-QandA-Infrastructure-a/$file/BLG-QandA-Infrastructure_June-2014.doc

[39] Local Government Act (Part 2, Section 14)

[40] https://www.dpmc.govt.nz/sites/default/files/2019-10/co-19-6-investment-management-and-asset-performance-state-services.pdf

[41] https://www.iso.org/news/2014/01/Ref1813.html

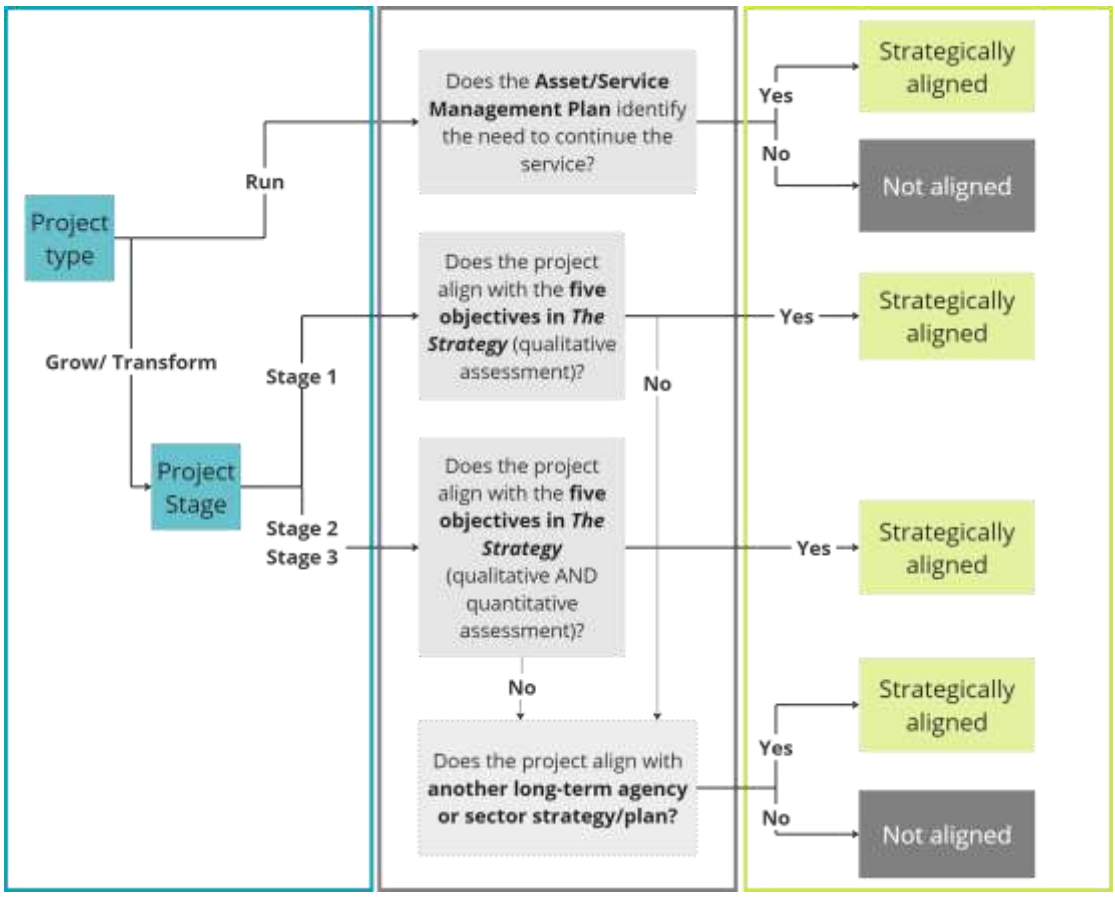
[42] https://apopo.co.nz/product/international-infrastructure-management-manual/

Because the Strategic Alignment Tool is a standalone product, it has an overarching process with more detailed questions and metrics (assessment methodologies) sitting beneath it.

Figure 11 outlines the high-level process for the Strategic Alignment Tool.

FIGURE 11: HIGH-LEVEL PROCESS FOR STRATEGIC ALIGNMENT WITH *THE STRATEGY*

Sorting gates	
Overarching process questions	
Outcome	



The following sub-sections describe the sorting gates and the assessment methodologies (i.e., the detailed questions and metrics) that sit beneath the process shown in Figure 11. We also outline options for the Tool's assessment outputs (e.g., RAG ratings), including outputs that highlight trade-offs between objectives. However, there ultimately needs to be a yes or no call for whether a proposal aligns with *The Infrastructure Strategy*.

Throughout the development phase, we have engaged with Te Waihanga to test, refine and strengthen the Strategic Alignment Tool.

Table 22 and outlines the key components of the Strategic Alignment Tool. **The sub-sections below should be read alongside Table 22 and Appendix C: Tool for strategic alignment with Rautaki Hanganga o Aotearoa.**

TABLE 22: COMPONENTS OF THE STRATEGIC ALIGNMENT TOOL

Sorting questions/ gates	
Qualitative sub-questions: testing a project's strategic alignment with the objectives	
Detailed/quantitative questions, with metrics: providing evidence for the preceding sub-questions for Stages 2 and 3	
Opportunities for assessors to provide comments/ recommendations	

5.2.1. Additional assumptions for Strategic Alignment Tool

In addition to the key assumptions outlined in Table 17 (see page 36), there are four important assumptions for the Strategic Alignment Tool.

TABLE 23: ADDITIONAL ASSUMPTIONS FOR THE STRATEGIC ALIGNMENT TOOL

Assumption	Reasoning and implication on design
1. RPAs, Strategic Assessments, and Business Cases are the core documents informing the design of the Strategic Alignment Tool	Currently, Te Waihanga does not have a mandate to require submissions from proponents. As such, it is important that barriers to submissions are minimised. In practice, this means basing submission requirements on existing documentation/templates as much as possible. Existing documentation (e.g., RPA) focuses more on infrastructure solutions than problems. As such, the questions in the Strategic Alignment Tool do not assess early-stage problems at this point. However, if/when Treasury updates the RPA, questions can also be updated.
Stage 1 – qualitative assessment 2. Qualitative assessment questions are a series of yes/no questions on whether a project contributes to a particular objective. These are based on: • Supplementary guidance provided by Te Waihanga	Each of the five objectives, such as Objective 3, "Building attractive and inclusive cities", can be interpreted and implemented in countless ways – even beyond the scope of infrastructure. Therefore, we needed a clearer and narrower definition of the objectives to design assessment questions that were relevant and bounded. As such, the sub-questions do not (and should not) cover all circumstances where a project could achieve against

Assumption	Reasoning and implication on design
• Subheadings under Section 6 of *The Strategy* • Definition of the objectives in the "Overview" Section of *The Strategy*	the high-level objectives (e.g., we do not have a question on the provision of green space for Objective 3). However, the sub-questions have been designed to capture the most important aspects and/or the spirit of the objectives.
Stage 2 and 3 – evidenced-based assessment 3. All detailed questions (blue box) are preceded by a qualitative question (pink box). Detailed questions outline metrics (e.g., 4% reduction in vehicle kilometres travelled (VKT)), which provides evidence/verification for the preceding question The metrics are: • **A hypothetical and illustrative guide**, indicating the level of impact that a project may have on the objectives • Adapted from existing government evaluation/ prioritisation processes (where possible)	Similar to the assumption above, each of the five objectives can be quantitatively assessed in countless ways. For example, Objective 3, "Building attractive and inclusive cities", has a qualitative question around whether the project makes urban transport networks work better. There are many metrics to assess the performance of transport networks, and there are at least three qualitative questions per objective. As such, it is unlikely that all metrics for assessing the objectives' qualitative questions can be outlined. Instead, the detailed questions act as verification of the evidence base for the qualitative questions, with the listed metrics being examples of what that evidence could look like. All detailed questions (blue box) are preceded by a qualitative question (pink box), that askes a yes or no question on whether a project contributes to the objective. **If a project does not provide sufficient evidence to answer a detailed question then the preceding qualitative question should be changed from a "Yes" to a "No".**
4. The Strategic Alignment Tool is designed to assess the submission, not the underlying project	The representation of a project through an RPA, Strategic Assessment, or Business Case may not accurately reflect the underlying project. As such, there could be a submission that clearly aligns with *The Strategy* but has not put forward a sufficient evidence base to support this. To avoid making the IPL a list of good business cases instead of good projects, we have included opportunities for assessors to provide comments and/or recommendations. These opportunities are illustrated by the questions in green boxes (see Table 22). Assuming that there is an open line of communication between Te Waihanga and submitters, this will help proponents improve their submission. This will be particularly useful for projects that would make the list with more details/minor improvements.

We also did not consider applying cut-off thresholds or materiality tests in the Strategic Alignment Tool (e.g., whole-of-life cost thresholds, problem/opportunity size thresholds, or a national significance tests). Instead, thresholds are considered and applied in the Triage step of the wider Assessment Framework Process (see Section 4.4.1).

5.2.2. Sorting gates

Project type

Te Waihanga stated that assessment processes should distinguish between "run" projects and ""grow/transform" projects.

Run projects are aimed at continuing to provide existing infrastructure services (e.g., through renewal and maintenance investment). In contrast, "grow/transform" projects are aimed at increasing infrastructure capacity, providing new services, or changing the quality of infrastructure. Figure 12 outlines our proposed categorisation of "run" and "grow/transform" projects, including wording on how recovery efforts from shocks and crisis should be categorised.

FIGURE 12: PROJECT-TYPE SORTING GATE

The underlying justifications (and therefore project information) for investments in run and grow projects is inherently different. As such, assessing these projects using the same approach may result in perverse findings or gaps in key assessment criteria.

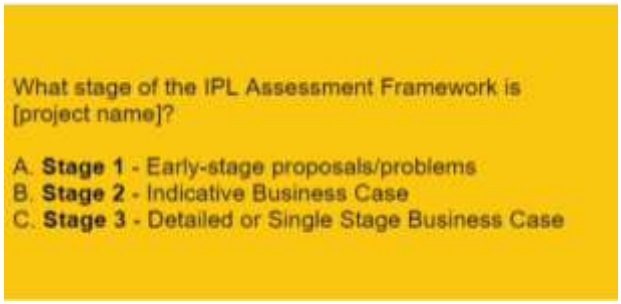
To ensure the Strategic Alignment tool accommodates these project types, we:

- assess run projects using Asset Management Plans and Service Management Plans; and
- assess grow/transform projects against the five objectives in *The Strategy* and other relevant sector/agency strategies.

Project stage (for "grow/transform" projects)

During our scan of existing documentation and templates, we found that RPAs and Strategic Assessments outline high-level and qualitative questions. As such, the Stage 1 strategic alignment questions are set at a high-level in line with exiting documentation. In comparison, Business Cases contain more detailed and quantitative information. As such, Stages 2 and 3 include qualitative as well as quantitative questions/metrics. Figure 13 outlines our proposed project-stage sorting gate.

FIGURE 13:PROJECT-STAGE SORTING GATE



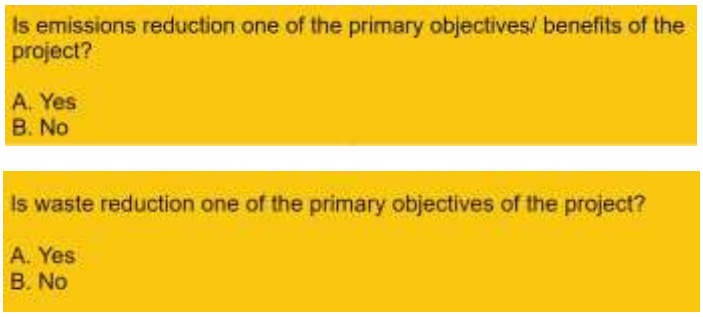
Two assessment tracks for Objectives 1 and 5 (across all stages)

Te Waihanga stated that it would be useful to have two assessment tracks under Objective 1 (enabling net-zero carbon emissions) and Objective 5 (moving to a circular economy). This is to differentiate between projects that have Objective 1 and/or 5 as their primary goal and those that do not (other projects). The proposed sorting questions for Objectives 1 and 5 are illustrated in Figure 14.

To align with *The Strategy* (all else equal), projects **that have** Objectives 1 and/or 5 as a primary goal must provide evidence that the project is likely to (Stage 1) or will (Stage 2 and 3) reduce emissions/waste compared to the base case.

To align with *The Strategy* (all else equal), other Stage 1 projects must consider their role in in minimising emissions/waste. And other Stage 2 and 3 projects must (1) sufficiently consider low-carbon options, (2) have credible plans to minimise carbon/waste, or (3) not materially increase emissions/waste compared to the base case.

FIGURE 14: ASSESSMENT TRACKS FOR "NET-ZERO" AND "CIRCULAR ECONOMY" OBJECTIVES

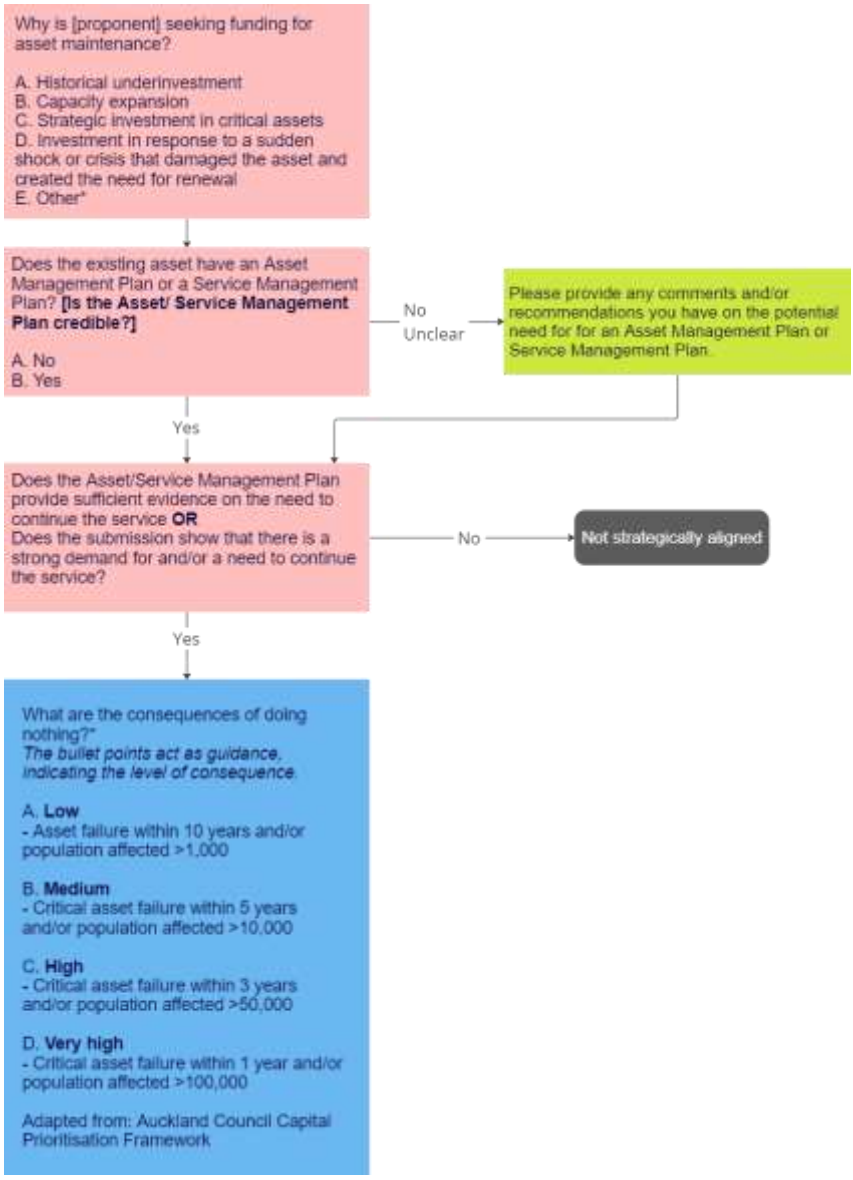


5.2.3. Testing the alignment of "run" projects

Figure 15 outlines the proposed strategic alignment test for "run" projects, which is the same across all Stages. The test focuses on whether the Asset Management or Service Management Plan provides sufficient evidence on the need to continue the service. In lieu of an Asset or Service Management Plan, we also consider if the submission demonstrates a strong demand for and/or need to continue the service.

Over time, it may be useful for Te Waihanga to compile a register of credible Asset/Service Management Plans. In the near term, the quality and credibility of these plans will need to be assessed on a case-by-case basis. Te Waiahanga should test if the timeline for a project aligns with asset management plans.

FIGURE 15: TESTING THE STRATEGIC ALIGNMENT OF RUN PROJECTS



*The asterisk in the pink box highlights that "Other" is intended to be a text input field. The asterisk in the blue box highlights that the quantitative question has been adapted from an existing assessment framework.

5.2.4. Testing the alignment of "grow/transform" projects

Design of the qualitative questions (Stages, 1, 2, and 3)

Grow/transform projects are assessed against each of the five objectives in Section 6 of *The Strategy*. At Stage 1, we do this at a high-level and use language such as:

- "Does the project consider…";
- "Does the project seek to…"; and
- "Is the project likely to…"

We have proposed these questions in line with information we can reasonably expect from Treasury's RPA and Strategic Assessment templates.

As outlined in Table 23, all of the five objectives can be interpreted and implemented in countless ways – even beyond the scope of infrastructure. Therefore, it is important to establish boundaries for the assessment questions to ensure that they are relevant, bounded, and capture the most important aspects of objectives.

We have used Te Waihanga's supplementary guidance as a starting point for identifying key assessment methodologies/questions for each objective. We have also based assessment methodologies on:

- The subheadings under the objectives in Section 6 of *The Strategy; and*
- The description of the objectives in the Overview Section of *The Strategy.*

As such, the assessment questions do not cover all possible circumstances where a project could achieve against the objectives. However, they have been designed to capture the most important aspects and/or the spirit of the objectives.

Design of detailed questions (Stages 2 and 3, providing an evidence base)

At Stage 2 and 3 we incorporate more detailed/quantitative questions, followed by metrics/indicators, and use language such as:

- "To what extent does the project improve…";
- "Does the project quantify…";
- "What is the expected change in"…;
- "What is the project's impact on…"; and
- "How robustly does the project…"

Each detailed question is preceded by a qualitative question. The detailed questions act as verification of the evidence base for the qualitative questions, with the listed metrics being examples of what that evidence could look like (illustrative). We have proposed detailed questions in line with information we can reasonably expect from Business Cases.

The metrics sitting under the detailed/quantitative questions are hypothetical and illustrative. These metrics help verify the evidence base and can also help assessors gauge the extent to which a project contributes to an objective. Currently, for detailed questions, projects can have a low, medium, or high impact on an objective (note that there are multiple qualitative and quantitative questions under each objective).

Moving forwards, Te Waihanga will need to either:

- set these metrics at levels it believes constitutes a low, medium, or high impact on the objectives; or

- can remove the low, medium, and high categories and simply opt to list key metrics (without levels) in the blue boxes. This approach still provides assessors with guidance on what metrics are suitable verifying the evidence base for the qualitative questions. For example, Objective 3, "Building Attractive and Inclusive cities" has a qualitative question on whether the project will improve urban transport networks. We would expect the following metrics to provide a suitable evidence base:
    - change in number of jobs accessed in morning peak,
    - change in the share of private passenger vehicle-based trips to other modes,
    - reduction in private VKT, and or
    - increase in percentage of the population living within 500m of a bus stop or 1km from a rail or bus rapid transit station where service frequency is ≤30 minutes per hour etc.

To make use of existing information and processes in New Zealand, we incorporated quantitative metrics from Waka Kotahi's Investment Prioritisation Method and Auckland Council's Capital Prioritisation Framework. There was particularly strong overlap between Waka Kotahi's Investment Prioritisation Method and Objectives 2 and 3.

Examples of questions under the Strategic alignment tool

In the following sections, we outline Te Waihanga's supplementary guidance for each of the five objectives as well as **examples** of assessment methodologies we have proposed.

The full Strategic Assessment Tool is outlined in Appendix C.

Objective 1: Enabling a net-zero carbon Aotearoa

FIGURE 16: OBJECTIVE 1: ENABLE NET-ZERO CARBON AOTEAROA (TE WAIHANGA'S SUPPLEMENTARY GUIDANCE)

Infrastructure should contribute to achieving an economy with net zero carbon emissions. It can do so by accelerating supply of low-emissions energy sources and transport options and prioritising solutions with lower whole-of-life carbon emissions.

TABLE 24: EXAMPLES OF ASSESSMENT METHODOLOGIES FOR OBJECTIVE 1

Qualitative questions	**Examples**
Does the project accelerate the supply of low-emissions energy sources, low emissions transport options, or emissions-reducing infrastructure?	(e.g., solar farms, wind farms, renewable energy battery banks, public or active transport options etc.)
Does the project prioritise solutions with lower whole-of-life emissions?	(e.g., consideration/ quantification of whole-of-life and indirect emissions, if the project considers its role in reducing/minimising emissions, if the project considers low-cost solutions etc.)
Illustrative detailed question/metric	
What is the expected impact on carbon emissions compared to the base case?* *The bullet points act as guidance, indicating the level of impact* A. **Low -** less than 0.1% of New Zealand's net CO2-e reduced per annum (on average) - Project will result in a >10% to 20% emissions reduction against a BAU scenario by 2030 and/or net zero by 2050 B. **Medium -** >0.1% to 1% of New Zealand's net CO2-e reduced per annum (on average) - Project will result in a >20% to 50% emissions reduction against a BAU scenario by 2030 and/or net zero by 2050 C. **High -** >1% of New Zealand's net CO2-e reduced per annum (on average) -Project will result in a >50% emissions reduction against a BAU scenario by 2030 and/or net zero by 2050 * Adapted from Auckland Council's Capital Prioritisation Framework	

Objective 2: Supporting towns and regions to flourish

FIGURE 17: OBJECTIVE 2: SUPPORTING TOWNS AND REGIONS (TE WAIHANGA'S SUPPLEMENTARY GUIDANCE)

Infrastructure initiatives for towns and regions should focus on achieving safe, reliable, and affordable core infrastructure services, connecting towns and regions with the rest of New Zealand, and reducing the need for infrastructure through demand management and strategic planning.

TABLE 25: EXAMPLES OF ASSESSMENT METHODOLOGIES FOR OBJECTIVE 2

Qualitative questions	**Examples**
Does the project improve the safety and reliability of core infrastructure services in towns and region?	(e.g., improving the safety of drinking water or road networks etc.)
Does the project enhance connectivity in towns and regions?	(e.g., improving digital connectivity through Ultrafast Broadband, and improving transport networks by decreasing travel time to major urban centres etc.)
Does the project reduce the need for infrastructure in towns and regions, or provide more affordable infrastructure solutions?	(e.g., demand management, enabling off-grid solutions (water tanks), and strategic planning etc.)
Does the project improve the efficiency and security of the freight and national supply chain?	(e.g., improvement in predictability of travel time for freight, reduction in duration of road closures and disruptions, and improving connections between production and distribution points etc.)
Illustrative detailed question/ metric	
What is the project's impact on network productivity and utilisation?* *The bullet points act as guidance, indicating the level of impact.* A. **Low -** 5 to10% improvement in predictability of travel time on priority routes for freight -(For rail) up to 10% change in freight trains arriving on time (within 30 mins of schedule) -Up to 10% reduction in duration of unplanned road closures/rail service disruptions/port and shipping disruptions of >2 hours -Improving connections between locally significant production and distribution points B. **Medium -** 11 to 20% improvement in predictability of travel time on priority routes for freight - (For rail) 11 to 20% change in freight trains arriving on time (within 30 mins of schedule) - 11 to 20% reduction in duration of unplanned road closures/rail service disruptions/port	

and shipping disruptions of >2 hours
- Improving connections between regionally significant production and distribution points

C. **High -** >21% improvement in predictability of travel time on priority routes for freight
- (For rail) >21% change in freight trains arriving on time (within 30 mins of schedule)
- >21% reduction in duration of unplanned road closures/rail service disruptions/port and shipping disruptions of >2 hours
- Improving connections between nationally significant production and distribution points

*Adapted from Waka Kotahi's Investment Prioritisation Method

Objective 3: Building attractive and inclusive cities

FIGURE 18: OBJECTIVE 3: BUILDING ATTRACTIVE, INCLUSIVE CITIES (TE WAIHANGA'S SUPPLEMENTARY GUIDANCE)

New Zealand's cities offer economic advantages and good quality of life, but face a range of challenges, including transport congestion, housing affordability, and water infrastructure performance. Infrastructure can address this through options that reduce exposure to congestion, providing infrastructure for housing development, and improving the functioning of urban infrastructure to increase attractiveness of cities as a place to live, work and play. Long-term planning in our cities should enable housing supply, integrate land use and infrastructure, and enable efficient and inclusive use of infrastructure.

TABLE 26: EXAMPLES OF ASSESSMENT METHODOLOGIES FOR OBJECTIVE 3

Qualitative questions	**Examples**
Does the project make urban transport networks work better?	(e.g., reducing exposure to congestion, improving access to amenity and opportunity, decreasing travel times, providing more public and/or active transport options etc.)
Does the project accommodate changes in long-term demand and population/ demographic change?	(e.g., enabling policies, enabling infrastructure for housing development, and/or increasing inclusivity etc.)
Does the project improve the functionality/sustainability of urban infrastructure?	(e.g., incentivising better management of assets and resources, digital twins for maintenance, and smart water meters etc.)
Illustrative detailed question/ metric	
What is the expected impact on congestion and mode shift?* *The bullet points act as guidance, indicating the level of impact.* A. **Low -** N/A B. **Medium -** Up to 3% change in share of private passenger vehicle-based trips to other modes - Investment to support behaviour change to improve mode shift outcomes - Up to 3% reduction in private VKT – can use change in AADT as a proxy C. **High -** >3% change in share of private passenger vehicle-based trips to other modes - >4% reduction in private VKT – can use change in AADT as a proxy *Adapted from Waka Kotahi's Investment Prioritisation Method	

Objective 4: Strengthening resilience to shocks and stresses

FIGURE 19: OBJECTIVE 4 STRENGTHENING RESILIENCE (TE WAIHANGA'S SUPPLEMENTARY GUIDANCE)

New Zealand faces stresses from climate change as well as shocks like natural disasters and man-made threats like cyberattacks, which can cut off communities or put human health at risk. Infrastructure investments should seek to ensure resilience for critical infrastructure services to shocks and build greater adaptation to a changing climate.

TABLE 27: EXAMPLES OF ASSESSMENT METHODOLOGIES FOR OBJECTIVE 4

Qualitative questions	**Examples**
Does the project enhance redundancy in our infrastructure network, improve assurance of minimum levels of service, and/or decrease disruption costs (i.e., backups for when something goes wrong)?	(e.g., ensuring power supply through backup generators, energy storage systems, or redundant transmission lines etc.)
Does the project address a climate change adaptation issue?	(e.g., flood management systems, managed retreat, seismic strengthening etc.)
Does the project consider its own vulnerabilities to shocks and stresses?	(e.g., vulnerabilities to sea-level rise, earthquakes, floods, cyber-attacks etc.)
Illustrative detailed question/ metric	
To what degree does the project enhance redundancies, improve assurance for service levels or decrease disruption costs?[43] (*bullet points are guidance indicating impact levels).* A. **Low** - The project enhances redundancies for locally important networks - The project reduces disruption costs for local networks - The project improves assurance of services for population of >10,000 to 50,000 B. **Medium** - The project enhances redundancies for regionally important networks - The project reduces disruption costs for regional networks - The project improves assurance of services for population of >50,000 to 100,000 C. **High** - The project enhances redundancies for nationally important networks - The project reduces disruption costs for national networks - The project improves assurance of services for population of >100,000 Disruption costs include: direct user costs (diversion through alternative routes, waiting for disruption to clear, trips cancelled); direct costs (injury or loss of life due to less-resilient infrastructure, repair/reinstatement costs, and impacts on essential services); and indirect costs (disaster preparedness, disruption costs to non-users).	

[43] Adapted from NZTA's Research Report 670: "Better measurement of the direct and indirect costs and benefits of resilience". See https://www.nzta.govt.nz/resources/research/reports/670

Objective 5: Moving to a circular economy

FIGURE 20: OBJECTIVE 5 MOVING TO A CIRCULAR ECONOMY TE WAIHANGA SUPPLEMENTARY GUIDANCE

Infrastructure should contribute to achieving an economy that minimises waste. It can do so by enabling provision of infrastructure for recycling waste and prioritising solutions that help to reduce construction waste. The provision of infrastructure should also seek to minimise waste across asset lifecycles

TABLE 28: EXAMPLES OF ASSESSMENT METHODOLOGIES FOR OBJECTIVE 5

Questions	Examples
Does the project enable the provision of infrastructure for recycling, reducing, or reusing waste?	(e.g., waste-to energy, material recovery facilities, composting facilities, curb side compost and recycling programmes, container return scheme etc.)
Does the project have credible plans to implement measures that will minimise waste across its lifecycle?	(e.g., consideration/quantification of the scale of the waste reduction opportunity, if the project considers its role in reducing/minimising waste, if the project uses low-waste and/or energy efficient designs, reusing products in the construction phase, if the project has a waste minimisation plan etc.)
Illustrative detailed question/ metric	
To what degree does this project make it easier for New Zealand to minimise waste? *The bullet points act as guidance, indicating the level of impact.* A. **Low** - The project helps divert <5% of national landfill tonnage - The project materially reduces waste at the local level B. **Medium** - The project helps divert >5 to 20% of nation-wide waste from landfills annually - The project materially reduces waste at the regional level C. **High** - The project helps divert >20% of waste from landfills (nationally) The Ministry for the Environment's Waste Assessment and Waste Management Planning Guide (2015) also outlines the following potential metrics: **Waste Quantities** (landfill tonnages, waste per capita, recycling tonnages, compost tonnages, food waste sent to landfill); **Composition** (Solid Waste Analysis Protocol, transfer station waste composition, kerbside collection composition, landfill composition); **Flows** (percentages/tonnages of waste/material diverted from landfills from construction/demolition activities, diverted materials composition) etc.	

5.2.5. Other considerations for the Strategic Alignment Tool

Strengthening partnerships with Māori

Section five of *The Strategy*, "Strengthening partnerships with and opportunities for Māori", prioritise three areas for action in the infrastructure system:

- Creating stronger partnerships with Māori across infrastructure planning and delivery.
- Unlocking opportunities for Māori across the infrastructure system.
- Incorporating mātauranga Māori into infrastructure design, planning and delivery.[44]

In their feedback to Part 1, Te Waihanga expressed interest on how the IPL's Assessment Framework could facilitate *The Strategy's* Māori objectives. However, these considerations are not in scope of this report and are outside of our area of expertise.

For meaningful insights on incorporating mātauranga Māori into the IPL, we recommend Te Waihanga procure advice from an expert(s) in Māori policy design, research, and community consultation. Te Waihanga may also wish to treat the IPL like any other infrastructure project, and follow *The Infrastructure Strategy's* guidance on effectively partnering with Māori (Table 29).

TABLE 29: MĀORI PARTNERING APPROACH

Principle	Could look like…
Plan together from the start	Engage Te Arawhiti and Te Puni Kōkiri as early as possible before any Assessment Framework designs are decided
Ensure outcomes are meaningful to all parties	Embed mātauranga Māori into the Strategic Alignment Tool, or design the tool to consider objectives and needs identified in Māori government Strategies (e.g., Te Pae Tata, Pae Tū, and Maihi Ka Ora)
Share decision-making	Decision-making processes include Māori representation

Source: Adapted from Te Arawhiti (2022), "Building Closer Partnerships with Māori"

Improving the Strategic Alignment Tool overtime

There are opportunities for Te Waihanga to improve on this methodology and to provide targeted guidance over time. For example, given a critical mass of submissions, Te Waihanga will be able to identify gaps/weaknesses in Businesses Cases by sector (e.g., health, or transport) or by methodology (e.g., Real Options Analysis). Te Waihanga will also be able to

[44] https://media.umbraco.io/te-waihanga-30-year-strategy/mmahiykn/rautaki-hanganga-o-aotearoa-new-zealand-infrastructure-strategy.pdf

compile common quantitative metrics that are used by sector to improve the coverage of the detailed questions outlined in the blue boxes (see Appendix C).

5.2.6. Scoring approach for Strategic Alignment Tool

The scoring approach for the Strategic Alignment Tool needs to consider the Processes and wider scoring system set out in Section 4.4.5.

In Section 4.4.5, we recommend using a traffic light system (RAG rating) for individual assessment criteria, including strategic alignment. However, strategic alignment with *The Strategy* is just one part of the wider strategic alignment assessment process that also considers if there is a clearly defined problem/opportunity; if the project is nationally significant; and other non-mandatory questions.

As such, there are two options for the scoring approach:

- **Binary assessment:** The proposal is aligned or not aligned with the Strategy; or
- **A traffic light system:** The proposal receives a "Red", "Amber", or "Green" rating, with Amber and Green projects being considered aligned with *The Strategy* for the purposes of the wider strategic alignment assessment process.

Based on our conversations with Te Waihanga, **we recommend using a traffic light system that can highlight when there are trade-offs between objectives**.

In Stage 1 projects are either "Aligned" or "Neutral" with each of the five objectives. In Stages 2 and 3, projects are "Aligned", "Neutral" or "Actively Detracting" with each of the five objectives.

Table 30 and Table 31 outline examples of how the traffic light system would work in practice.

TABLE 30: STAGE ONE STRATEGIC ALIGNMENT TOOL SCORE

Circumstance	Rating
No meaningful contribution to any of the five objectives	Red rating
Meaningful contribution to one of the five objectives	Amber rating
Meaningful contribution to more than one of the five objectives	Green rating

TABLE 31: STAGES TWO AND THREE STRATEGIC ALIGNMENT TOOL SCORE

Circumstance	Rating
No meaningful contribution to any of the five objectives AND/OR Actively Detracts from more than one of the objectives	Red rating
Meaningful contribution to one or more of the five objectives AND one "Actively Detracts" rating	Amber rating (indicates trade-off)

Meaningful contribution to more than one of the five objectives (with no "Actively Detracts" ratings)	Green rating

5.2.7. Considering other agency and sector strategies

Te Waihanga has noted that the five objectives in *The Strategy* are unlikely to anticipate all possible infrastructure needs. For example, a new hospital (located in Auckland) is unlikely to align with the five objectives. As such, it is important that the Strategic Alignment Tool considers strategic objectives/ needs identified by other strategy documents, where relevant.

As outlined in Section 1.4, completing a comprehensive review of other sector strategies is outside the scope of this report. However, providing advice on what types of other strategies Te Waihanga should use as a basis for defining strategic alignment is in scope.

In Table 32, outlines what we would expect infrastructure providers to do to produce high-quality and credible plans. This is based on:

- Section 7.1 of the *Strategy*, which signals the role of sector-level long-term strategic planning, and asset management planning to identify infrastructure needs; and
- Recommendations 38 and 39.

TABLE 32: EXPECTATIONS FOR INFRASTRUCTURE PROVIDERS AND AGENCIES

We expect…	Looks like…
Infrastructure problems and opportunities are quantified as a part of long-term planning	Plans include analysis on how existing infrastructure will perform and the level of service it will provide under a range of futures.
Agencies conduct long-term investment planning and asset management planning that aligns with standards for local government and regulated infrastructure	Agencies produce long term investment plans that cover a 10-year period (updated every three years), currently only Local Governments are required to do this. The plans clearly identify investment intentions and their costs.
Transparency and credibility in long-term investment planning	Agencies share plans for funding beyond the annual budget cycle. Plans should be aligned with agency service-delivery strategies, fiscally sustainable, and linked with budget allocations and other sources of financing.

We recommend that Te Waihanga run a separate process to evaluate other sector/agency strategies (including cross-sector strategies such as the Emissions Reduction Plan). A natural starting point could be sectors that are not fully represented by the five objectives (e.g., New Zealand Health Strategy, The School Property Strategy, the Public housing plan etc).

The output of this review would be a living register of high-quality and credible sector/agency strategies. This register could be a valuable resource for IPL assessments, allowing assessors

to reference the vetted register instead of reviewing strategies/plans as they are mentioned in submissions. Over time, this will also mitigate task duplication, which could be significant depending on the number of IPL reviews.

5.3. Value for money methodologies

We have developed a comprehensive register of 12 commonly used value for money, risk, and uncertainty methodologies used in project appraisals.

As outlined in the *Assessment Framework Design Guidance for Supplier* document, we focused on methodologies that can be applied across all types of projects (e.g., renewal projects as well as new infrastructure) and different asset classes (e.g., hospitals as well as roads).

The full register can be found in Appendix D and outlines:

- A brief description of the methodologies;
- the benefits/strengths and costs/weaknesses of the methodologies;
- the appropriate Stage(s) for using the methodologies (i.e., use Cost-Benefit Analysis in Stages 2 and 3).

5.3.1. Summary of methodologies

Figure 21 summarises the appropriate Stage(s) for using the methodologies. We have identified four methodologies that should be included in Stage 2 and Stage 3 proposals (with few exceptions) - these are standard approaches for assessing infrastructure projects:

1. **Cost-Benefit Analysis (CBA)** (value for money methodology)
2. **Scenario testing** (uncertainty methodology)
3. **Qualitative risk assessment** (risk methodology)
4. **Sensitivity testing** (risk methodology)

We have used the phrase "methodology should be used" as opposed to "methodology should be required", as a non-trivial proportion of New Zealand infrastructure proposals do not include these assessments. For example, four of the 10 (Stage 2 and 3) real-world projects we tested the Assessment Framework against did not have CBAs (see Appendix E). If CBA was a requirement for a Stage 2 or 3 assessment, then it is unlikely that the IPL would quickly achieve a critical mass of projects.

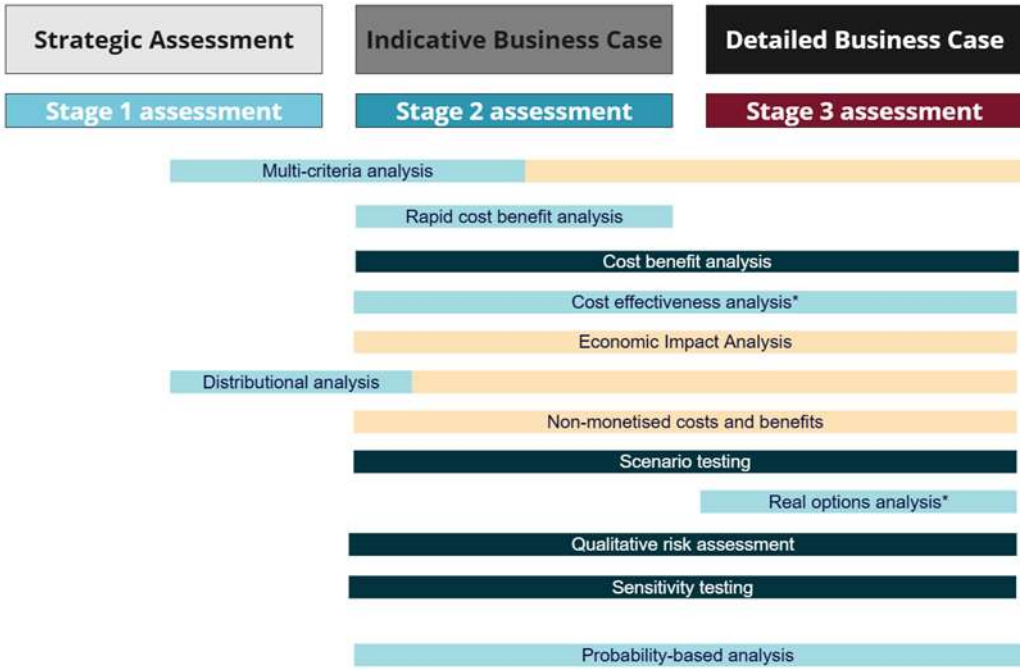
Similar to the design considerations for the Stages and Processes (see Table 19), we recommend that assessments are initially less onerous/rigid (i.e., no methodology requirements) and then are developed overtime. For instance, **CBA and the other standard approaches could be signalled as future requirements for IPL assessments.**

However, the value for money Assessment Process (Stage 2), currently enables projects to be "filtered out" for inadequate project appraisals. The Assessment Process includes the question: "Has an appropriate methodology been used to assess the shortlisted options?". If the answer

is no, then the proposal fails the value for money assessment. In these instances, Te Waihanga could provide feedback to proponents on any shortfalls or gaps in the project's appraisal. Assuming that the reviewer has sufficient expertise, this approach (compared to requiring methodologies) balances the need for robust and flexible proposal evaluations.

FIGURE 21: APPROPRIATE STAGE(S) FOR VALUE FOR MONEY METHODOLOGIES

Should use methodology	
Can use methodology	
Can use methodology **alongside** a more robust analysis	



*Cost effectiveness analysis can be used in limited cases in Stages 2 and 3 (see Section below). Real Options Analysis should be used in Stage 3 if Scenario Analysis highlights that uncertainties have a significant impact on investment outcomes.

5.3.2. Standard approaches for assessing infrastructure projects

Table 33 outlines the strengths and weaknesses of the four "should use" methodologies: CBA, scenario analysis, Qualitative Risk Assessment, and sensitivity testing. These methodologies should be used in both Stage 2 (IBC) and Stage 3 (DBC).

The full register of methodologies can be found in Appendix D.

TABLE 33: STRENGTHS-WEAKNESSES OF STANDARD METHODOLOGIES FOR ASSESSING INFRASTRUCTURE PROPOSALS

Strength and weaknesses assessment includes when to use the different methdologies

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
Value for Money				
Cost Benefit Analysis (CBA)	**Selecting the preferred option** A CBA systematically measures the effects of a project over its lifetime, including the project's social, economic, and environmental impacts. It does this by quantifying the present value of a project's costs and benefits. The output of a CBA is a Benefit-Cost Ratio (BCR), with ratios over 1 indicating that the project is net beneficial to society. A CBA is generally used to help identify the preferred option. However, where costs/benefits are difficult to quantify or monetise, and/or where distributional impacts are an important consideration, a CBA may be one tool as a part of a more holistic approach to identifying a preferred option.	• Considers a wide range of monetary and non-monetary factors • Uses a structured framework that allows for relatively more transparency and objectivity • Most robust tool for economic appraisal • Flexible in its application to different types of intervention and across sectors	• Typically, the most time and cost intensive tool to determine value for money • Some costs and/or benefits can be difficult to quantify and/or monetise • Relies on simplifying assumptions that may not reflect reality • Does not consider equity • Can be complex, so requires either outside expertise or high levels of staff capability • May not be suitable for transformational projects	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Use in Stage 2:** Because CBA is relatively time and cost intensive, it is an inefficient tool for (1) filtering options from the longlist, or (2) for identifying the shortlist. However, CBA should be used to inform/select the preferred option as CBA provides the most objectivity and rigour to justify and support a decision. Because decisions on funding often occur at the IBC stage, emphasising the need for detailed CBA at Stage 2 is appropriate to ensure that there are at least some options that deliver value for money (particularly for large, high-cost projects). **Use in Stage 3:** For an DBC or a SSBC, detailed CBA is the most appropriate tool for assessing value for money.
Uncertainty analysis for project options that incorporate flexibility				
Scenario analysis (uncertainty)	**Assess project outcomes under a range of possible futures to better understand and manage uncertainty** Scenario analysis is based on the premise that investing in infrastructure is complex and that the future is uncertain. As such, it is important to understand and strategically plan for how projects will perform under different futures. Scenarios can be modelled in detail or assessed qualitatively. Scenario analysis is useful for identifying plausible future states (e.g., high-population growth, environmental change, policy, or regulatory changes etc) and finding a solution/option that is robust across different futures. Dynamic Adaptive Policy Pathways (a broader decision-making approach that emphasises long-term-planning and adaptation in the face of uncertainty) also incorporates Scenario analysis.	• Helps decisionmakers anticipate and prepare for different future opportunities and challenges, enabling more strategic planning • The analysis maintains relevance by accommodating changing assumptions, inputs, and trends as new information becomes available • Considers multiple factors, uncertainties, and interdependencies	• Limited predictive power • Scenario Analysis lacks standardisation of methodologies and frameworks • There is limited guidance in New Zealand (mostly focused on climate change)	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** Identify scenarios that cannot be managed through risk analysis and would impact options analysis (e.g., high population growth). Develop and apply these scenarios to test the expected impact of uncertainty on the value for money analysis and/or commercial analysis. In most cases, a scenario analysis would include 3-4 coherent and evidence-based futures. The set of scenarios should include optimistic, pessimistic, and more or less probable developments, based on the identified uncertainties. **Use in Stage 3:** Further refine and apply Scenario Analysis.

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
Risk analysis for fixed project options				
Qualitative risk assessment	**Use to identify, estimate, and mitigate risks when there is a clear enough future** Qualitative risk assessment involves: 1) identifying the full range of project risks; 2) estimating their likelihood of occurrence and expected impact on the project; 3) developing mitigations to key risks; and 4) reassessing risks after mitigations have been applied. Qualitative risk assessment is a useful tool for all proposals. Qualitative risk assessment can include quantitative and qualitative analysis, as well as inputs from specialists and/or stakeholders.	• Relatively simple to understand and apply • Rapidly identifies relevant risks, so is time and cost effective • Helps raise early awareness of potential risks and encourages proactive risk management by initiating discussions on risk mitigation actions	• Subjectivity, particularly around providing risk impact ratings and likelihood of occurrence ratings • Lack of precision and comparability between risks, which makes it difficult to prioritise risk management efforts • May not capture all key risks, or may not capture the complexity of identified risks	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** Develop a list of all relevant risks while identifying/ analysing options. Then, identify the highest rated risks for further analysis. Risks are typically rated using likelihood of occurrence and impact. **Use in Stage 3:** Validate qualitative risk assessment for the shortlist of options. Then , develop a detailed risk register (including mitigations) for the preferred option.
Quantitative risk analysis: • Sensitivity analysis	**Determine the potential impacts of risks on project outcomes by varying key inputs and assumptions** Sensitivity analysis is used to test how the costs and benefits of each option change if there is a change in a particular input or assumption, set of inputs and assumptions, or set of assumed changes in the outcomes (e.g., costs increase by 20%, or assume benefits are 20% lower). The detail of this analysis can vary from a simple "what-if" test to more complex modelling. Sensitivity analysis and Scenario analysis can look identical in practice (e.g., assume different levels of land-use). However, the purpose of these analyses are fundamentally different. • Sensitivity analysis aims to determine the potential impacts of **risks** on project outcomes by varying inputs and assumptions to see how much they change expected outcomes. This also highlights which inputs have the largest impact on outputs. • Scenario analysis helps to ensure that preferred options are robust to different futures and **uncertainty** by testing how robust options are against several alternative scenarios, rather than developing one assumed future.	• Helps decisionmakers understand the key factors and variables that impact project outcomes • Can enhance the robustness of CBA if it is incorporated • Sensitivity analysis can also highlight the limitations of CBA and identify project vulnerabilities	• Limited precision, particularly for "what-if scenarios" • If a scenario analysis only examines one input variable at a time, it risks missing important interactions and dependencies between variables	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** In the IBC, proponents should be cognisant of key sensitivities of the shortlisted options (e.g., land use settings). **Use in Stage 3:** DBCs should explore project-specific sensitivities and "general" sensitivities (e.g., discount rates, under/overestimation of costs and benefits, Best- and Worst-Case Scenarios, and deferral tests etc). Common sensitivity tests applied at the Business Case stage include: • Discount rate: +/- 3% around Treasury's recommended discount rate • Capital costs: +/- 20% around central estimate • Maintenance and operation costs: +/- 20% around central estimate • Benefits: +/- 20% around central estimate

5.3.3. Approach to value for money methodologies

For the majority of cases, CBA is the appropriate tool for assessing a project's value for money, and for informing/selecting the preferred option.[45] This is because CBA provides the most objectivity and rigour to justify and support an investment decision.

There are however limited cases where Cost Effectiveness Analysis may be more suitable. Cost Effectiveness Analysis can be used instead of CBA in cases where a projects benefits are similar across options and are related to the overall objectives of the proposal.

This is particularly relevant to projects that have a strong policy objective for a certain level of service to be delivered, for example, improving digital connectivity in rural areas or reducing the road toll.

Cost-benefit analysis should be the main tool for assessing value for money

Only assessment of costs and benefits can reveal the opportunity cost of spending. This assessment should be value free; decision-makers are then empowered to make decisions for communities using a strong evidence-based approach.

In addition to providing a value assessment, cost-benefit analysis can also be used to compare and rank projects designed to address to the same problem.

Criticisms of cost-benefit analysis can be mitigated through good design

At times, CBA is criticized because it does not consider equity (i.e., CBA is agnostic about who benefits, and it is assumed that $1 has a constant marginal value for all individuals). However, nothing is preventing incorporation of a distribution of weights. For example, the HM Treasury argue for upweighting certain groups according to their incomes since the marginal utility of income increases as incomes decline.[46] Others argue that the tax and transfer system is best placed to address equity issues.

Regardless, these are not issues specific to cost-benefit analysis but require decisions about the relative standing of groups of individuals regardless of the tool employed to assess the project. However, generally we might expect results weighted by different groups to be presented alongside unweighted results to ensure transparency.

CBA is also consistent with broad frameworks such as New Zealand Treasury's living standards framework. In many ways, the Living Standards Framework is simply a rich model of the costs and benefits to be considered.[47]

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[45] https://www.infrastructureaustralia.gov.au/sites/default/files/2021-07/Assessment%20Framework%202021%20Guide%20to%20economic%20appraisal.pdf

[46] Harberger, 1978, Hahn 2010 and Hammitt 2021 all show how weights could be incorporated.

[47] Tim Hughes, 2021, points out the Living Standards Framework is consistent with a robust cost-benefit approach."

5.3.4. Other value for money methodologies can be complementary

Rapid CBA

A Rapid CBA applies standard CBA principles and techniques to compare options using the same present value concept of comparing benefit and costs. A rapid CBA is suitable for removing inefficient options from a longlist or for identifying shortlisted options as rapid CBA:

- focuses on quantifying only the most material economic costs and benefits
- has a lower level of precision about design, costs, and benefits
- makes additional simplifying assumptions relative to a standard CBA process.

It is not a robust tool and should not ever be used to select the preferred final option.

Cost effective analysis

Cost Effectiveness Analysis is concerned with maximising agreed outcomes within a given cost constraint.

Cost Effectiveness Analysis can be used in limited cases for Stage 2 and Stage 3. For instance, when a project's benefits/outcomes are similar across options and are related to the overall objectives of the proposal. This is particularly relevant to projects that have a strong policy objective for a certain level of service to be delivered (e.g., reducing the road toll).

But since Cost Effectiveness Analysis never quantify the benefits of the objective of the project, cost effectiveness cannot assess if spending on the project provides value for money. So, cost effectiveness should only be used in a limited set of cases.

Economic impact analysis

Economic impact analysis estimates the effect that a project or programme will have on the structure of the economy, or on the economic welfare of groups of people. Economic impacts are usually expressed in terms of number of jobs, income effects, tax revenue, and good/service output etc, broken down by sector and/or location.

Economic impact analysis is narrower than cost-benefit analysis. It does not capture wider economic benefits. Nor does it consider social, cultural, or environmental outcomes.

Traditionally, economic impact assessments have focussed on jobs and economic activity. Often, projects have used input-output tables to generate multipliers for jobs. But these methods have been discredited. Impact multipliers from input-output tables tend to overstate economic benefits.[48]

New Zealand Treasury suggests multiplier effects should be ignored since resources counted as benefits for any project or programme are already utilised elsewhere in the economy unless there is high unemployment.[49]

[48] See Hannum 2015 for example

[49] See New Zealand Treasury 2015.

Multi-criteria analysis

Multi-Criteria Analysis (MCA) uses multiple, often qualitative criteria, to compare different alternatives and options. MCA is useful for reducing an initial long list of options that align with strategic objectives to a smaller, filtered list of options for more detailed assessment.

MCA is also useful for comparing options where a project's impacts cannot be easily monetised or quantified. In these instances, MCA can be used as a complementary tool alongside more robust methodologies that outline the monetised costs and benefits (i.e., CBA). Detailed MCA guidance can help improve consistency of application across projects.

But the key weakness of MCA are the criteria used for evaluation. There is no assurance that the criteria are appropriate. So, any project that scores highest on MCA may not provide value for money and may not have benefits that exceed costs. So, MCA should not be used to support project selection in Stages 2 and 3.

Non-monetised costs and benefits

Where possible, costs and benefits should be monetised. But this might not always be possible. If impacts cannot be monetised, then quantification of impacts is the next best option. Where impacts cannot be quantified, then qualitative evidence or "narrative analysis" is still useful.

Impacts that may be difficult to monetise include cultural impacts, equity and distributional impacts, Māori values, value of open space, and mental health impacts etc.

Non-monetised costs and benefits can be used in Stage 2 and Stage 3 to support a more robust analysis. For example, when a project's impacts cannot be expressed in monetary units. This analysis is useful for:

- resolving "line calls" where two options have similar monetised BCRs, and
- asking structured questions about how large non-monetised benefits would have to be to select an option with a relatively lower monetised BCR.

Non-monetised costs and benefits is not a robust tool for decision making but can be used to **support a more holistic and robust analysis**. It does so by:

- increasing the contextual and holistic understanding of less tangible factors such as mental health, local history and needs, and cultural and indigenous values; and
- captures perspectives and values of stakeholders who prioritise non-monetary factors.

As such, non-monetised impacts may provide important information for decision-makers to fully understand the impacts of the option being considered.

5.3.5. Dealing with uncertainty

The take-up or demand for infrastructure services needs to be considered when evaluating infrastructure projects. Intrinsically, thinking about the future is uncertain. As such, assessment methodologies (particularly for stage 2 and stage 3) should account for uncertainty.

Two mechanisms are useful: (1) scenario analysis and (2) Monte Carlo simulation of results over a distribution of key parameters.

Scenario analysis centres on a qualitative assessment of the likely factors or situations that might materially affect outcomes. These scenarios might relate to the likelihood of alternative government policies, technology change, or a change in the underlying economy that might affect the cost of borrowing or procuring particular goods and services.

Often scenario analysis will cover three cases: (1) a base or central case, (2) an optimistic scenario, and (3) a pessimistic scenario. In general, little consideration is given on weighting the probability of alternative scenarios. Instead, the scenarios can draw out two different factors and events, which influence costs and benefits.

In contrast, Monte Carlo simulation focusses on a quantitative assessment of the costs and benefits of projects. Monte Carlo simulation draws random parameters from distributions to create alternative models of the key impacts and calculates the costs and benefits of the project under each set of parameters.

This approach can reveal how the interaction of factors drives the results and highlights the sensitivity of results to key parameters. Interactions across parameters imply that in general, the expected value or average across the draws will not produce the same costs and benefits as using the average or median draw alone.

Monte Carlo analysis is a powerful yet easy-to-apply tool that should be applied as a key component of assessment methodologies.

Opportunities and real options analysis

Large, complex projects should use opportunities analysis or real options analysis. These projects can create powerful network effects such as opportunities for future investments. These effects can often only be revealed once the project is completed. For example, real options valuation could examine the opportunity for firms to invest in expanding production in a local area impacted by new infrastructure.

Te Waihanga might want to consider developing guidance on when and where real options analysis is required and where a simpler qualitative "opportunities analysis" may be sufficient.[50] Guidance could align with existing advice provided on real options under the proposed Climate Change Adaption Act.

[50] https://motu-www.motu.org.nz/wpapers/10_05.pdf

5.4. Deliverability tools

In Section 4.4.2, we recommended that deliverability (alongside strategic alignment, and value for money) be a standalone criterion in the IPL's Assessment Framework.

Outlining methods for assessing deliverability was not originally in scope of this report. However, for completeness, we outline high-level advice for how Te Waihanga could assess deliverability. Our advice is based on findings from the international case studies (Section 2).

5.4.1. Case study findings

Case studies showed that deliverability is a key consideration, but that there are no common methodologies to assess deliverability performance. However, there are a range of tools used by proponents to develop aspects of deliverability (e.g., probabilistic costing, feasibility studies, market analysis etc.). These should be reviewed as part of the assessment but will not in themselves provide a full picture of the deliverability of projects.

The case studies typically reviewed the deliverability of projects qualitatively against a wide range of questions or focus areas to identify risks pertaining to costs, schedule, market capacity, and various aspects of deliverability. This accounts for the fact that each project will have its own unique deliverability considerations and risks, so **assessments rely on reviewer expertise in these areas**. These reviews can be strengthened by using benchmarking data (e.g., Te Waihanga*, The lay of the land: Benchmarking New Zealand's infrastructure delivery costs*) and lessons learnt from previous projects to better test deliverability.

If deliverability expertise is limited, high level commentary around inherent risks (e.g., market capacity constraints, property acquisition, and utilities etc.) can still be useful.

We understand that Te Waihanga has in-house expertise in infrastructure delivery. As such, we recommend that Te Waihanga consider what role its Deliverability Group have in assessing projects for the IPL. Similar to Section 5.3, Te Waihanga may also wish to have a register of commonly used deliverability tools.

Unlike "value for money" and CBA, there is no one robust methodology or tool for assessing deliverability. Instead, many tools are required to prove that a project can be delivered on time and on budget. As such, a deliverability register should focus on what information (including information maturity) is expected for each tool by Assessment Stage, project size, and project sector. This register could be informed by both domestic and international best practice (e.g., Te Waihanga's *Major Infrastructure Project Governance Guidance*). Some common deliverability tools under the Better Business Case model include:

- **Commercial Case** – market analysis; feasibility studies; pre-project, and investigative due diligence; register of required services and outputs; procurement strategy etc.
- **Management Case** – risk, project, change, and benefits management arrangements; governance arrangements (if applicable); benefits realisation plan etc.
- **Economic and Financial Case** – includes all of the "uncertainty tools" in Section 5.3.

6. Testing stages and processes

6.1. Scope

We proposed developing a hypothetical set of 8-12 projects to help us test the potential assessment stages and processes. We stated that these projects would represent a range of characteristics including sector, scale, funding source, project versus programme, information quality, and maturity.

The purpose of testing the stages and processes was to:

1. **Test the practicality of the process**. For example, could the process be completed given the information that Te Waihanga would reasonably have access to?
2. **Get a better understanding of the scope of the IPL.** For example, which projects would make the list, which projects wouldn't, and what key project characteristics (e.g., scale, sector, funding source etc) drove these decisions?
3. **Identify potential risks, challenges, and tensions.** For example, the trade-off between public transparency and minimising barriers for proponents/ agencies (i.e., agencies may not want to apply to the IPL if it fears a publicised negative assessment).

We also proposed running an Assessment Workshop with you to ensure that the processes were fit for purpose. We did not propose completing a comprehensive assessment of the sample projects.

Table 34 outlines the 12 sample projects that we tested against the stages and processes. We selected these projects based on the public availability of Business Cases. These projects represent a range of sectors, locations, cost, and project type.

All projects in Table 34 are real New Zealand projects, except for, the project: "Congestion Charging Auckland". We added this project to explore how the process could accommodate a low-cost, non-built infrastructure project that is a Recommendation in *The Infrastructure Strategy*.

We tested projects with DBCs and Implementation BCs across Stages 1, 2, and 3. We tested projects with PBCs, IBCs or Preliminary BCs across Stages 1, and 2. And we tested projects with no BCs against Stage 1.

A full table, including project descriptions, is outlined in Appendix E

TABLE 34: SAMPLE PROJECTS

Project	Sector	Location	Cost	Type	Information
Puhoi to Warkworth[51]	Transport	Auckland	$1.7b – $2.1b	Project	DBC
Congestion Charging	*Transport*	*Auckland*	*N/A*	*Project*	*None*
Wellington to Hutt Valley cycle link[52]	Active Transport	Wellington	$50m	Project	DBC
District Council Water Plan[53]	Local govt, and Water	New Plymouth	$25m	Plan	BC
Kopu Marine Precinct[54]	Economic growth	Thames-Coromandel	$9.4m	Programme	DBC
NZ Battery Project[55]	Energy	Nation-wide	>$15b	Project	IBC
Tauranga Stadium[56]	Social	Tauranga	$187m	Project	Preliminary BC
Scott Base Redevelopment[57]	Research	Antarctica	$553m	Project	Implementation BC
Dunedin Hospital[58]	Health	Dunedin	$1.7b	Project	DBC
Mangere Precinct[59]	Housing	Auckland	$1.54b	Programme	PBC
Defence Estate Regeneration[60]	Defence	Nation-wide	>$2.1b	Programme	BC
Christchurch Schools Rebuild	Education	Christchurch	$1.65b	Programme	Not available

[51] https://www.nzta.govt.nz/assets/projects/ara-tuhono-warkworth-to-wellsford/detailed-business-case-oct-2019.pdf

[52] https://www.nzta.govt.nz/assets/projects/wellington-to-hutt-valley-walking-and-cycling-link/Part-A-Detailed-Business-Case-Final-V8.pdf

[53] https://www.npdc.govt.nz/media/jfhkzjkg/water-conservation-plan-business-case.pdf

[54] https://www.epa.govt.nz/assets/Uploads/Documents/Fast-track-consenting/Kopu/Addendum-application-documents/Appendix-F-Kopu-Business-Case-Redacted.pdf

[55] https://www.mbie.govt.nz/dmsdocument/26295-new-zealand-battery-project-indicative-business-case-and-appendices-february-2023

[56] https://www.tauranga.govt.nz/Portals/0/data/exploring/parks/active-reserves/files/proposed-stadium-priority-one%20prelim-business-case.pdf

[57] https://www.mfat.govt.nz/assets/OIA/PR-2021-0256-Scott-Base-Development-Combined_Redacted.pdf

[58] https://www.health.govt.nz/system/files/documents/pages/2_-_new_dunedin_hospital_final_detailed_business_case_0.pdf

[59] https://www.hud.govt.nz/assets/Uploads/Documents/Mangere-PBC-compressed.pdf

[60] https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/Defence-Estate-Work-Programme-Annex-C-Draft-Defence-Estate-Portfolio-Business-Case-2019-v2.pdf

6.2. Assessment Workshop on stages and processes

6.2.1. Testing the Stages

We tested the assessment stages through a two-step approach to understand the strengths and challenges of each potential assessment stage.

We held an initial workshop with Te Waihanga that covered:

- Key assumptions and implications for assessment stages (see Section 4.2)
- Review of existing Better Business Cases stages (see Section 4.3.1)
- Analysis of potential pre- and post-BBC stages (see Section 4.3.2)
- Longlist of potential stage options (see Section 4.3.3)
- Shortlist of stage options and potential pathways (see Section 4.3.4).

Through this workshop, we discussed the different stage options and their alignment with the priority list objectives. Based on the shortlisted options (either using stages 1 and 2, or stages 1, 2 and 3), we agreed that all three Better Business Cases stages should be taken forward as assessment stages for further testing.

This testing undertaken in the assessment workshop in collaboration with Te Waihanga considered both assessment stages and processes against the sample project list. For assessment stages, we considered:

- What level of proposal information is likely to be available at each stage;
- How well the assessment stages can accommodate projects of different sectors, infrastructure types and scale;
- Which stages will have the most influence on proposal outcomes or have other benefits that align with the objectives of the priority list; and which stages have challenges or areas of risks for Te Waihanga or proponents.

Key findings from this step are set out in Section 6.3.

6.2.2. Testing the Processes

The assessment workshop was held to provide an interactive and practical test of the assessment processes (as well as stages and methodologies). While the workshop did not involve an actual assessment of the sample projects, it highlighted the potential strengths and challenges for different project types going through the assessment process.

In advance of the workshop, participants were asked to review the documentation that had been identified for projects (typically indicative and detailed business cases) and to consider their potential performance against the process questions. In particular, the workshop focused on project types that appeared to not address the process questions. The key

discussion points were then on whether this was a suitable outcome (i.e., a given project was not suitable or ready to pass that assessment area) or whether the framework required adjustment.

6.3. Learnings

The assessment workshop provided several learnings that allowed us to refine our recommendations:

- **Information availability:** Across the majority of sample projects, there were information gaps or deficiencies. This pointed to the need in some cases to simplify assessment process questions and also to ensure that there is an opportunity for Te Waihanga to seek further information.
- **Triage requirements:** The process should be flexible enough to consider not only infrastructure proposals, but also proposals that could potentially avoid the need for future infrastructure. Te Waihanga also does not want to exclude any potential sectors for the IPL in its initial phase.
- **Testing strategic alignment:** The process for testing strategic alignment with objectives from *The Strategy* should develop over the stages, initially focusing on whether a proposal broadly aligns or not, to then understanding whether a proposal has a material impact, little impact or negative impact to the objective.
- **Testing value for money:** At stage 2, the process should use a threshold to determine if project or project options represent value for money. Where proposal options do not meet this threshold, the assessment should consider whether all appropriate options have been considered (including partial solutions that may provide better value for money).
- **Testing deliverability:** Deliverability issues have the potential to be managed and resolved during project development, so it should not necessarily be a hurdle for initial assessment stages. There is still value, however, in highlighting deliverability concerns/issues (i.e., deliverability is still a review area but not an assessment area). At stage 3, where the IPL identifies investment-ready proposals, deliverability should be an assessment criterion.

These findings have been incorporated into our recommended stages, processes, and methodologies for the assessment framework. We also identified different potential opportunities or source of tension/risk. These are set out in Table 35 (overleaf) alongside potential responses.

TABLE 35: OPPORTUNITIES AND RISKS IDENTIFIED IN THE ASSESSMENT WORKSHOP

Item	Potential response
Opportunity: Using a cross-sector or region needs analysis to self-nominate proposals on the IPL for long term needs that have not been submitted by proponents	Te Waihanga could consider whether this information already exists and can be amalgamated or whether there is a potential role for it to undertake this work
Opportunity: Collecting and leveraging project data to provide other bespoke advice/insight to government (e.g., cost benchmarking, common risk areas, etc.)	Te Waihanga could develop a database (or leverage existing databases) to collect a standard set of information from each project submission. It is important to note that this will typically be ex-ante information and potentially subject to change as a project is delivered.
Opportunity: Creating conditions for positive recommendations that proponents must meet in the next stage (e.g., a proposal will pass stage 2 if they commit to assessing an additional option in the detailed business case)	Te Waihanga could initially monitor the quality of submissions and determine if there is a need to make requirements like this. We note that the strength of this requirement will also depend on the status and perceived benefit of being included on the IPL.
Risk: Te Waihanga being asked to review and provide advice on a project that does not fall within the scope of the IPL	Te Waihanga could consider a separate avenue (distinct from the IPL) to assess projects, but still using the assessment framework if appropriate. This could be applied, for example, if government sought Te Waihanga advice on a commercial project that is highly confidential, which may not be suitable for publication through the IPL.
Risk: Potential differences in alignment between *The Strategy* objectives and government priorities	In our recommended framework, *The Strategy* objectives are the primary test for strategic alignment. Government objectives and priorities should still be considered, but are not treated as threshold matters. This helps the IPL provide a longer-term and more consistent view of infrastructure needs.
Risk: Proposals already having preferred options at an early stage	Te Waihanga could consider not listing proposals by the name of their solutions, but instead their underlying problems/opportunities at early stages. Once sufficient options assessment has taken place, a more specific name for the proposed solution could be used. This is the approach taken by Infrastructure Australia.

Item	Potential response
Risk: Publishing negative assessments and disincentivising submissions	Te Waihanga will need to manage a balance between public transparency and the risk for proponents of a negative assessment, as this could significantly deter the number of submissions and overall status/recognition of the IPL. Potential responses to this include having more concise outputs for negative assessments that focus on what further work is required or different avenues such as publishing a list of submissions that were assessed but not added to the IPL at this time in existing reporting. However, Te Waihanga will also need to consider its requirements under the Official Information Act.

7. Developing Assessment Framework Options

7.1. Scope of option development

Te Waihanga sought written advice on how the IPL Assessment Framework could be applied in the New Zealand context, including the development of:

- **a minimum viable product option** for the Assessment Framework, and
- **a do-maximum option** for the Assessment Framework.

This advice is informed by deliverables completed in Part 1, with a focus on the New Zealand context. Action 3 in *The Infrastructure Action Plan* outlines that Te Waihanga will work with the Treasury to develop an infrastructure priority list.[61] We understand that Te Waihanga will be working with Treasury over the next few months to explore options for the IPL's Assessment Framework.

We recommend taking these options forward as part of your collaboration with Treasury. We have also provided advice on how Te Waihanga could develop final Assessment Framework options with Treasury, including by developing a joint register of "must have" and "nice to have" components of the IPL.

Te Waihanga also sought advice on the resourcing implications of different options. Specifically, Te Waihanga have asked for a set of reliable estimates for the resourcing required per assessment at a given stage (based on the case studies and our Australian experience).

7.2. Minimum viable product and do-maximum

7.2.1. Assumptions – must haves versus nice to haves

We recommend that Te Waihanga define a register of "must have" and "nice to have" components of the IPL. The register should be informed by Te Waihanga's objectives for the IPL (see Section 1.3) alongside key insights from the New Zealand context (see Section 3.5).

Table 36 outlines an illustrative example of a **key component register that can be used as an assumption base to develop a minimum viable product option and a do maximum option.** The table also highlights whether the inclusion of a component is supported by Te Waihanga's objectives for the IPL, insights from the New Zealand context, or both. We recommend that Te Waihanga complete a similar register in collaboration with Treasury to get a clear and agreed understanding of the role of the IPL in New Zealand's IMS.

[61] https://www.treasury.govt.nz/sites/default/files/2023-05/infrastructure-action-plan-2023.pdf

TABLE 36: KEY COMPONENTS FOR OPTION DEVELOPMENT (ILLUSTRATIVE)

	Te Waihanga Objective	Insights from gap analysis	Framework component
Must have (foundations of the IPL)			
Public transparency on nationally significant projects			• Publicised list of positively assessed projects
Identify long-term infrastructure needs that go beyond immediate budget decisions			• Stage 1 Assessments • Strategic Alignment Tool • *Infrastructure needs assessment (separate workstream)*
Lifting quality/minimum standards of Business Cases			• Proponent feedback
Identifying opportunities for cooperation (co-ordination)			• Built-in consideration of other relevant sector strategies (in the Strategic Alignment Tool or wider Assessment Process)
Nice to have			
Assessing proposals outside of central government			• Process for collecting submissions outside of central government
Advice to ministers and Cabinet			• Te Waihanga comment in quarterly reporting
Ensuring strategic alignment and value for money			• Stage 1 and Stage 2 Assessments • Strategic Alignment Tool
Improving project assurance			• Stage 2 and Stage 3 Assessments
Improving knowledge of gaps and problems in relevant sectors			• Building register of key gaps overtime • Publishing sector/assessment methodology guidance
Public transparency on all projects			• Publicised list of all projects that are assessed

7.2.2. Illustrative example of minimum viable product

We believe that the minimum viable product option should be designed to satisfy the "must have" objectives and insights outlined in Table 36. **These "must have" Assessment Framework components represent the foundations of the IPL.** As such, the minimum viable product could include the components outlined in Figure 22.

FIGURE 22: OPTION 1, MINIMUM VIABLE PRODUCT

7.2.3. Building on the minimum viable product

We recommend holding the foundations of the IPL fixed across all options, with further options being designed by adding additional components to the Assessment Framework. This approach has the following benefits:

- **Staging:** Options are buildable and can be staged, which allows Te Waihanga to increase its capacity overtime (see Figure 25)
- **Speed:** Implementing a minimum viable product will be faster than implementing a do-maximum option, which allows Te Waihanga to build critical mass on an IPL quickly (likely starting with Stage 1 projects/programmes).
- **Collaboration:** Te Waihanga is developing the IPL in collaboration with the Treasury, and there will likely be differing options on the design of the IPL. Building consensus on the IPL's foundational components, then expanding on that foundation to create new options, will facilitate a more effective design process. This is because additional components can be considered individually as opposed to being considered in a group, which will allow Treasury and Te Waihanga to identify exact points of disagreement.

Figure 23 to Figure 25 outline options for the IPL's Assessment Framework. Option 2 builds on and is all inclusive of Option 1, and Option 3 builds on and is all inclusive of Option 2.

FIGURE 23: OPTION 2, PRE-INVESTMENT DECISION FOCUS (ILLUSTRATIVE)

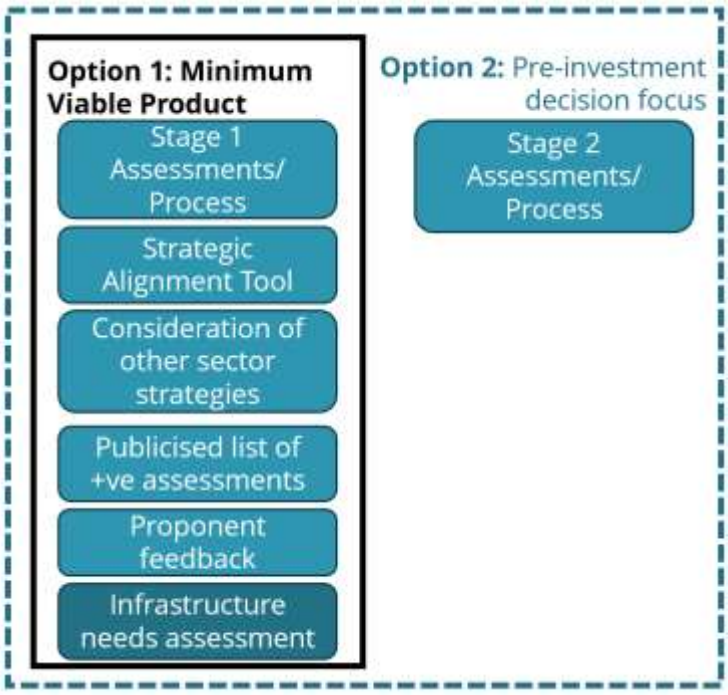
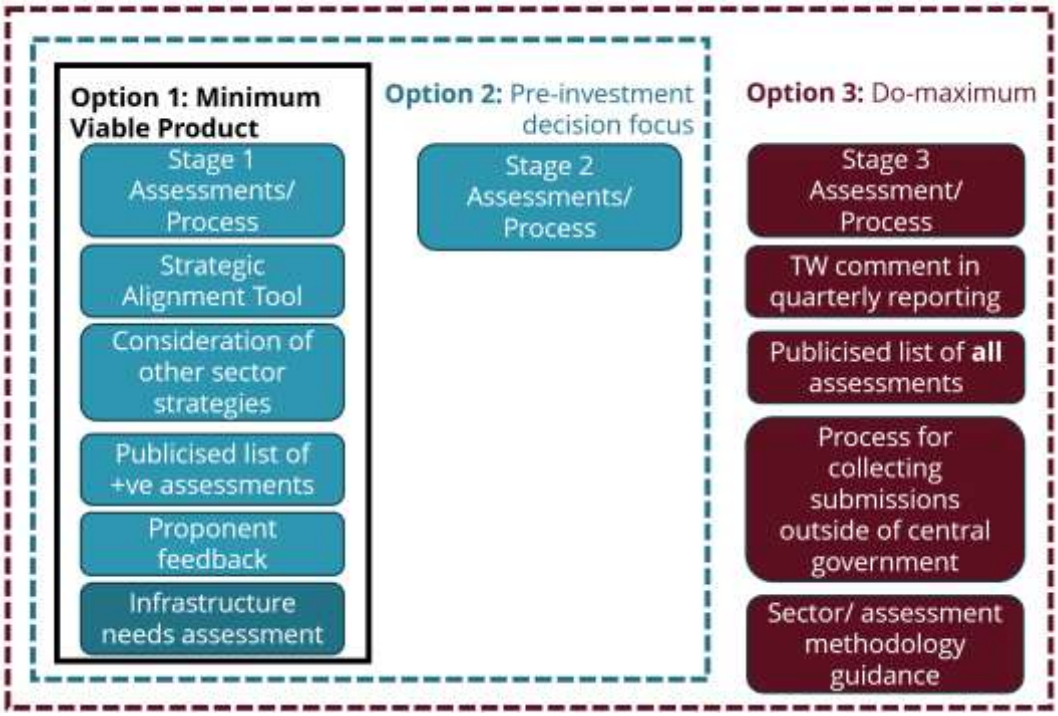


FIGURE 24: OPTION 3, DO-MAXIMUM (ILLUSTRATIVE)

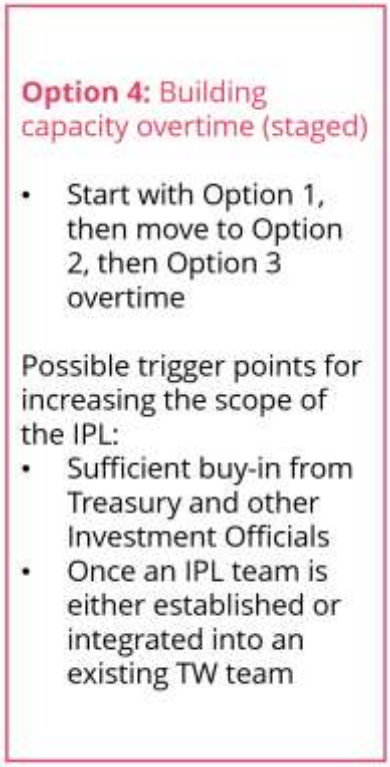


Option 4 (the staged option) highlights that Te Waihanga could implement Option 1 (minimum viable product), then implement Options 2 and 3 over time as capacity is built.

If Te Waihanga is considering a staged option, we recommend that clear expectations and milestones for increasing the scope of the IPL are established from the outset. In Figure 25, we outline two illustrative trigger points where Te Waihanga could move between Option 1 and Option 2:

- When there is sufficient buy-in from Treasury and other Investment Officials, and/or
- Once an IPL team is either established or integrated into an existing team at Te Waihanga.

FIGURE 25: STAGED OPTION (ILLUSTRATIVE)



7.3. Resourcing implications

Our estimates of resourcing required per assessment are based on the case studies and our Australian experience. These estimates are high-level as final Assessment Framework options have not been defined yet.

7.3.1. Findings from case studies

Table 37 shows that there is large variation in Full-Time-Equivalent (FTE) requirements across the case studies. For example, Infrastructure NSW has much more FTE than Infrastructure Australia. This may be because Infrastructure Australia focuses more on early-stage projects (78% of submissions are early-stage proposals), which is less resource intensive than assessing full business cases.[62]

TABLE 37: RESOURCING FOR ASSESSMENTS ACROSS PART 1'S CASE STUDIES

Case study	Assessment management	Assessment process
Infrastructure Australia	The team managing business case evaluations usually has between 4-6 FTE, who manage consultants that undertake assessments[63]	**Stage 1:** one assessor 2-3 days of work **Stage 2:** one assessor 3-5 days of work **Stage 3:** one assessor 2-3 weeks of work over several months These timings significantly depend on the level of complexity for assessments. *(Note that these are consultant times)*
Infrastructure NSW	Assurance function is 20-30 FTE	All reviews usually have 3-4 reviewers who work for about 2 weeks per review
World Bank	Not publicly available	Not available
Chile[64]	214 FTE working on technical-economic appraisal of projects	Average of $480 USD is spent reviewing each initiative
Korea[65]	34 staff reported in the Public Investment Evaluation Division in 2014	An average of 26 Preliminary Feasibility Studies (PFSs) were completed each year between 2011 and 2021. PFSs are expected to take four months

[62] Options for progressing an Infrastructure Priority List (Te Waihanga supplied report)

[63] Note that Infrastructure Australia has previously undertaken some assessments 'in house' but we understand that this is the minority of cases

[64] https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/institutional-safeguards-for-cost-benefit-analysis-lessons-from-the-chilean-national-investment-system/46E1ED22C9857E0311E0AA5959E27462

[65] https://rksi.adb.org/wp-content/uploads/2020/10/ppp-units-and-pimac-korea.pdf

7.3.2. Resourcing per proposal

There is significant overlap between Infrastructure Australia's IPL and the initial design of New Zealand's IPL. Both IPL Assessment Frameworks have three stages and focus on areas such as the strategic case, economic case (societal impact in the case of Infrastructure Australia) and deliverability. The nature of the reviews evolve over time (e.g., with a greater focus on deliverability at stage 3).

There are some differences in submission requirements. For example, Infrastructure Australia provides a Stage 1 template for submissions, which most proponents use. Whereas, we have recommended that RPAs and Strategic Assessments are used to assess Stage 1 proposals in New Zealand. However, the purpose and the contents of these documents are very similar, with Infrastructure Australia having a stronger focus on problem quantification and monetisation in Stage 1.

For Stage 2 and Stage 3, submission requirements are very similar. Business Cases are required for Stage 3 submissions, and Infrastructure Australia's Stage 2 Submission Checklist outlines the typical steps to identify a shortlist of options (which is required in an IBC).[66][67] However, we do recognise that there are likely minor idiosyncratic differences between New Zealand and Australia regarding Business Case information requirements/ expectations.

As such, a natural starting point for estimating the resourcing needed per proposal is Infrastructure Australia's IPL. Table 38 outlines our resourcing estimates per assessment (by stage). We have presented our estimates as ranges as the actual requirements will significantly depend on the nature and quality of submissions, and the approach taken up by Te Waihanga.

It takes Infrastructure NSW a similar amount of time to assess a proposal as it takes for Infrastructure Australia to assess a Stage 3 proposal (2-3 weeks). This is likely because Infrastructure NSW focuses more on assessing full business cases. This similarity strengthens the Stage 3 resourcing estimate. Note these resources estimates are for the actual assessment process and do not capture ancillary activities such as the administration of receiving proposals, communicating with proponents, preparing internal governance documents, publishing outputs and so on.

TABLE 38: RESOURCING REQUIREMENTS PER PROPOSAL (BY STAGE)

	Days	Hours	Hours (mid-point)
Stage 1	2-3	16-24	20
Stage 2	3-5	24-40	32
Stage 3	10-15	80-120	100

[66] https://www.infrastructureaustralia.gov.au/submit-a-proposal

[67] https://www.infrastructureaustralia.gov.au/stage-2-identifying-and-analysing-options

For Infrastructure Australia, the increasing resourcing requirements by stage reflect several factors, such as:

- Quantity and complexity of submission information to review
- Extent of questions or items within each assessment criteria to review
- Volume of assessment outputs to produce.

Estimated resource requirements also reflect actual assessment time, as opposed to total elapsed time from submission to completion. For instance, a stage 3 assessment could take several months due to:

- Proponents needing to provide further information to pass triage
- Infrastructure Australia issuing any clarification questions on the submission material, and the time required for proponents to respond
- Timing of internal reviews and governance processes (e.g., Board meeting cycles).

As a result, the assessment hours typically occur over a much longer period, but with small peaks in activity as opposed to constant activity.

7.3.3. Use of external consultants

Infrastructure Australia use external consultants as assessors to help manage irregular resourcing requirements. In the past, particularly for annual Infrastructure Priority List updates.

These updates often involve a large volume of submissions and assessments over a 2–3-month period. The use of external consultants as assessors allows resourcing to ramp-up and ramp-down to cater for this peak in activity.

The use of external consultants also allows Infrastructure Australia to access a wide range of experts with different backgrounds and capabilities that can be matched to a given proposal. Some of the potential challenges associated with using external consultants are:

- Organisational knowledge/capability: It is important to continue building and maintaining expertise within the organisation, such as through 'in-house' assessments, close working arrangements with assessors and identifying opportunities for knowledge transfer
- Responsiveness to submissions: Lengthy procurement process can add delays if an unexpected submission is received. Early engagement with proponents and a clear pipeline of submissions is helpful in minimising these delays
- Assessor consistency: Proper oversight and management of assessors is important to ensure the framework is being applied consistently by different external assessors (noting that this challenge can still occur with in-house resources). This can be supported by having clear and practical assessment guidance, and by regularly comparing assessment process and outputs across projects.

- Managing conflicts: Appropriate procedures and practices are necessary to avoid any actual or potential conflicts of interests for external consultants, such as if they were involved in the early planning of a proposal that has since been developed into a business case.

Once the final Assessment Framework options have been finalised, Te Waihanga can use these assumptions of time resources to estimate the additional resourcing or staff needed to deliver IPL assessments.

We note that Te Waihanga will need to consider the timing of assessments and corresponding resource requirements, as assessments will not necessarily be spread evenly across the year. Addressing this will likely require a combination of careful management of Te Waihanga staff time, a structured intake process for proposals, or use of external consultant resources.

We also recommend considering resourcing requirements for ancillary activities (e.g., administration for receiving submissions) and to what extent these can be met with existing resources.

Appendix A: International case studies

Chile's Sistema Nacional de Inversiones (SNI)

Key takeaways for the New Zealand context

- **Sector-specific requirements** – Developing different requirements for unique sectors (or sub-sectors) enables a balance of rigour and practicality. Creating a consistent quantitative framework for multi-crtieria analysis (MCA) can lift rigour in these cases.
- **Choosing from validated projects** – While the framework does not prioritise beyond a positive rating, it requires decision makers in agencies to proiritise and allocate funding to a set of projects that have rigourously demonstrated value-for-money.
- ***Ex post* analysis** – The system includes *ex post* evaluations of a representative sample of projects each year, giving them important insights into project outcomes as well as evaluation rigour.

Organisation overview

Chile's SNI is a centralised public investment system. The Ministry of Social Development (MDS) is responsible for *ex-ante* project appraisal and *ex-post* evaluation. By law, all public sector institutions (except Defense) wishing to develop an investment project must do so via the SNI, and projects must receive a positive rating from SNI to apply for funding (except for projects funded solely by the national government). The prioritisation of projects with a positive rating is the responsibility of the funding agency.

Framework overview

The proponent engages in an iterative process of submissions and approval via the SNI that involves increasing levels of detail as the project progresses through the system. MDS assesses the project and approves or rejects its progression depending on whether it meets the requirements at each stage. For most projects, cost-benefit analysis (CBA) is used as a filtering tool based on a minimum specified internal rate of return (IRR). Cost effectiveness analysis (CEA) and MCA are also used in some instances.

Process overview:

Case study scorecard:

Rigour	Adaptability	Influence
• MDS is independent of funding agencies and appraisals are prepared using sector-specific methodological guides. • Projects must meet increasingly detailed information. No strict criteria for non-CBA aspects.	• Framework is generally sector- and scale-agnostic. • Framework includes CEA and MCA approaches as filters where there are perceived limitations with CBA.	• Legal requirement for public sector investment projects. • A positive rating is required for most projects to be eligible for funding. • Proponents can choose the approach to prioritising projects from a SNI approved set.

Note: ● indicates a high score and O indicates a low score

Framework description

The SNI is framework is based on a series of gates and independent reviews by MDS. All investment initiatives are required to be input into an Integral Project Bank (BIP), an open digital registry. The BIP tracks project development from initial proposal through ex-post project evaluation.

Proponents submit project information to the SNI via the BIP platform at the following stages:

- **Profile (concept):** problem, project, and alternative solutions outlined. Assessment of project feasibility and alternative solutions are provided to support project selection.
- **Prefeasibility:** additional information on project details including tentative schedules, budgets, and expected benefits.
- **Feasibility:** full feasibility studies including CBA, CEA and MCA.
- **Design:** technical studies completed, and detailed project schedules and budgets specified.
- **Execution**: project is approved to seek funding.

Simple projects may not need to include detailed information at every stage or complete every stage.

At each stage, MDS issues an Economic Technical Analysis Results (RATE) recommendation. The projects that attain a socially recommended (RS) RATE are moved to the next stage. A proponent can seek funding for a project that obtains an RS RATE at the execution stage. Our research suggests that proponents have 10 working days to provide a revised version of the project if at any stage it is deemed to lack information or is objected to for technical reasons.

CBA is the main assessment tool used to filter projects and test for value-for-money. However, for some sectors the methodological guides recommend the use of CEA or MCA. These tools can also be used to augment a CBA with a low IRR where it is deemed that the CBA is not capturing important social benefits. Strategic alignment is tested in the initial submission stages, though we could not identify any formal/structured process for assessing this aspect.

The SNI framework does not prioritise or rank projects. All projects with an RS RATE at the execution stage are eligible to apply for funding. Projects are typically funded by the proponent unit's annual budget allocated by the Ministry of Finance. It is up to that unit to prioritise projects from an SNI approved set. SNI also undertakes a simplified *ex post* analysis of a representative sample of projects each year, as well as in-depth *ex post* analyses less commonly.

Key strengths and advantages:

- **Sector-specific requirements** – SNI uses a quantitative MCA approach for certain sectors, such as rural water. It has established criteria and weightings that improve the rigour of these approaches.
- **Productivity focus** – for most sectors, CBA results are fundamental for a positive rating. While CBA has its limitations, it is widely regarded as the best available tool to estimate the productivity impacts of a particular intervention.
- **Connection to decision making** – With the exception of projects solely funded by the national government, all public projects must have a positive rating through the SNI to apply for funding.

Key limitations:

- **Limited prioritisation** – The SNI only filters projects, it does not necessarily make recommendations on which projects should be prioritised
- **Perceptions around CBA** – Most appraisals, particularly for small-to-medium sized projects, are partial (financial) CBAs that rely on highly standardised assumptions and often yield results with limited variance across projects. Due to time and resource demands, the CBA typically only account for select costs and benefits, favouring projects that generate higher revenues.
- **Lack of consistent criteria** – There is no set criteria or evaluation theme used across each stage. This makes it challenging to consistently evaluate projects or to communicate key findings beyond a positive/negative recommendation.

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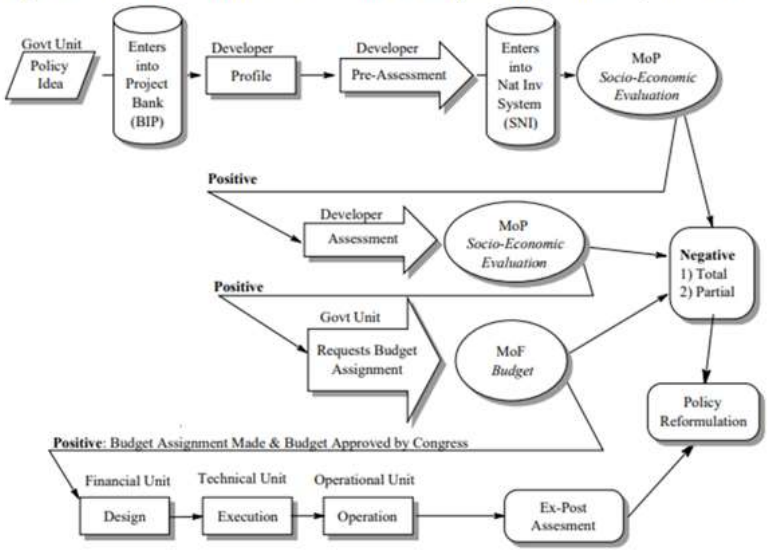
Other relevant material/extracts

We have extracted some key artefacts from Chile's SNI. Figure 1 below provides a flowchart of the SNI process. It demonstrates the early registration of projects and multiple evaluation steps before a budget recommendation is made.

Figure 1 SNI flowchart

Fig. 1. Schematic Public-Investment Project Appraisal Cycle in Chile



Source: L. Eduardo (2006), p.2

Figure 2 below provides an example of the sector-specific guidance that is provided for rural water projects. For these projects, multi-criteria analysis is used but there are set indicators and weightings across criteria, helping provide a consistent assessment of these projects.

Figure 2 Multi-Criteria Analysis specifications for rural water projects

Criteria / Weight	Indicators / Sub-criteria
Economic 18.4%	Social VAN ($ million) Investment ($ million) / hectare Investment ($ million) / land plots
Social 34.1%	% households under poverty line Surface area of subsistence farms / small farms <12 ha Number of beneficiaries (population in irrigable zone) Indigenous communities in the territory [0,1] % growth of rural population during last inter-census period Extreme zone, border region, or undeveloped area [0,1]
Strategic 22.6%	Number of water shortage decrees in past five years Number of jobs generated (landowners and relatives) Number of irrigation association systems that can be connected[7] Electricity generation capacity (MWh/year)
Environmental / Territorial 9.2%	Number of people required to relocate Number of archaeological site affected Hectares of native forest in flood zone
Management 15.7%	Interest/support of beneficiaries Economic contribution of regional government (regional government contribution / total project investment) Organization (1-4 indicating degree of incorporation / legal standing) Number of land parcels required to expropriate

Source: Ministerio de Hacienda, 2014. Minuta Matriz Multicriterio Plan de Pequeños Embalses

Source: D. Marcelo et al. (2018), p. 18

Infrastructure Australia

Key takeaways for the New Zealand context

- **Problem analysis:** A quantitative approach to problem and opportunity analysis helps improve early-stage proposal rigour. However, a rigid threshold for recommendations limits strategic considerations and can have unintended longer-term consequences.
- **Review timing:** Only mandating formal review at the detailed business case stage means projects are usually well-advanced but have less scope for influence. Funding and prioritisation decisions are often also locked in, or worse, projects are under delivery.
- **Focusing on the evidence:** Allowing submissions from any level of government and the community (and from Infrastructure Australia audit findings) enables the Infrastructure Priority List (IPL) to identify nationally significant infrastructure issues, even if jurisdictions do not perceive them as so.

Organisation overview

Infrastructure Australia (IA) is the Australian Government's independent infrastructure advisor and was established in 2008 through legislation. It undertakes evaluations of transport, energy, communications and water projects, and regularly publishes an IPL. IA is required to assess projects seeking more than $250m AUD of Australian Government funding as advice for government. IA does not make funding decisions and the Australian Government does not necessarily require a postive evaluation from IA to fund a project.

Framework overview

The Infrastructure Australia Assessment Framework (IAAF) governs IA's evaluation of proposals across four key stages. Only stage 3 (where proponents submit business cases) is mandatory for seeking Australian Government funding. Three consistent assessment criteria are used in each stage (strategic fit, societal impact and deliverability) but IA does not publish a formal rating against each criteria, instead only choosing to include or not include projects on the IPL (unless the government has already committed funding). The IPL lists successful proposals against stages but does not prioritise within these stages. Cost-benefit analysis (CBA), or its underlying principles, are used across all stages.

Process overview:

Case study scorecard:

Rigour	Adaptability	Influence
• IA has often not approved projects, despite them being endorsed by state/territory governments. • IA has extensive submission requirements, e.g., functional CBA models. • Evaluations typically occur over three to six month periods with formal correspondence. • Deliverability assessment is typically higher level due to skillset of assessors (primarily economics).	• Framework is generally sector- and scale-agnostic. • Information requirements create tension where projects are funded or seen as not well suited to CBA. • The rigid national significance threshold limits flexibility and has led to a lengthy priority list (currently 166 proposals). • Open to public and private submissions.	• Recent review of IA found it had been 'sidelined' and not as influential as desired. • However, we do consider that IA has helped improve business case practices across Australia. • IPL is also seen as important step towards Australian Government funding by many jurisdictions.

Note: ● indicates a high score and O indicates a low score

Framework description

IA uses three broad core criteria to consider all submissions:

- **Strategic alignment** – *'Is there a clear rationale for the proposal?'*
- **Societal impact** – *'What is the value of the proposal to society and the economy?'*
- **Deliverability** – *'Can the proposal be delivered successfully?'*

These are assessed qualitatively against the supporting themes (see Appendix). Societal impact is an expanded value-for-money criteria, which considers not only CBA results but also quality of life, longer term resilience, sustainability impacts and more. The evidence and analysis for each criteria increases according to the four project stages set out below:

1. **Defining problems and opportunities (optional[1])** – IA strongly encourages a focus on problems and opportunities, as opposed to potential solutions. In our experience, the key focus is on proponents monetising the problem cost(s) and/or opportunity value(s), for comparison against a national significance threshold ($30m AUD nominal, undiscounted). If they meet this threshold, show good strategic alignment and have no major deliverability risks, they are included on the IPL at Stage 1. Problem/opportunity timeframes are listed on the IPL, but there is no further prioritisation of Stage 1 proposals.
2. **Identifying and analysing options (optional[1])** – IA requires proponents to demonstrate that a wide range of options have been thoroughly assessed to develop an options shortlist for the business case. Proponents typically need to use at least rapid-CBA on the options shortlist (often after multi-criteria analysis for the options longlist) to demonstrate positive societal impact. In our experience, relatively few proponents provide Stage 2 submissions to IA.
3. **Developing a business case (required)** – The Australian Government requires business cases seeking over $250 million AUD in funding to complete this stage. This is the only stage where an evaluation summary is published by IA (in addition to the IPL listing descriptions). Proponents submit final business cases with detailed appendices across all technical aspects. IA typically sends clarification questions 3-4 weeks after the submission for the proponent to respond to, and it typically takes 3-6 months from submission to an evaluation summary to be published.
4. **Post completion review (optional)** – IA sets out a comprehensive post-completion review process, but we are not aware of any project that has approached IA at this stage.

The IPL currently includes 126 proposals at stage 1, 31 proposals at stage 2, and 9 proposals at stage 3.

Key strengths and advantages:

- **Business case standards** – Stage 3 requires proponents to deliver high quality business cases, or to work through extended evaluation timeframes. Many jurisdictions have developed guidance and processes that align with the IA approach, which demonstrates its influence.
- **Transparency** - IA publishes an evaluation summary at stage 3, which provides transparency and accountability to the public. These also attract significant media attention.
- **Rigour** – Quantitative problem analysis at stage 1, rapid-CBA at stage 2 and rigorous business case requirements at stage 3 ensures that proposals on the IPL have a strong evidence base for decision makers.

Key limitations:

- **Disconnect with decision making** – Up to 2023, IA's primary channel for its advice to the Australian Government was only through the published evaluation summaries, rather than direct briefings or through a formal governance channel. However, this issue is being partially addressed, with IA now providing advice directly into the budget process.
- **Evaluation outputs** – The IPL and evaluation summaries serve a wide range of audiences and purposes, including transparency to the public, feedback to proponents, and strategic advice to government. Bespoke outputs to these different audiences could provide better value and help strengthen its influence
- **Perceptions around CBA** – IA continues to face stakeholder criticism around a perceived focus on cost-benefit analysis results. While it has taken steps to change the IAAF and its broader communication strategies, this criticism remains – impacting on its reputation and influence.

[1] If a proponent has not completed a stage 1 and/or stage 2 submission, they must still provide this type of information in their stage 3 submission.

References

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Other relevant material/extracts

We have extracted some key artefacts from Infrastructure Australia's IAAF for reference.

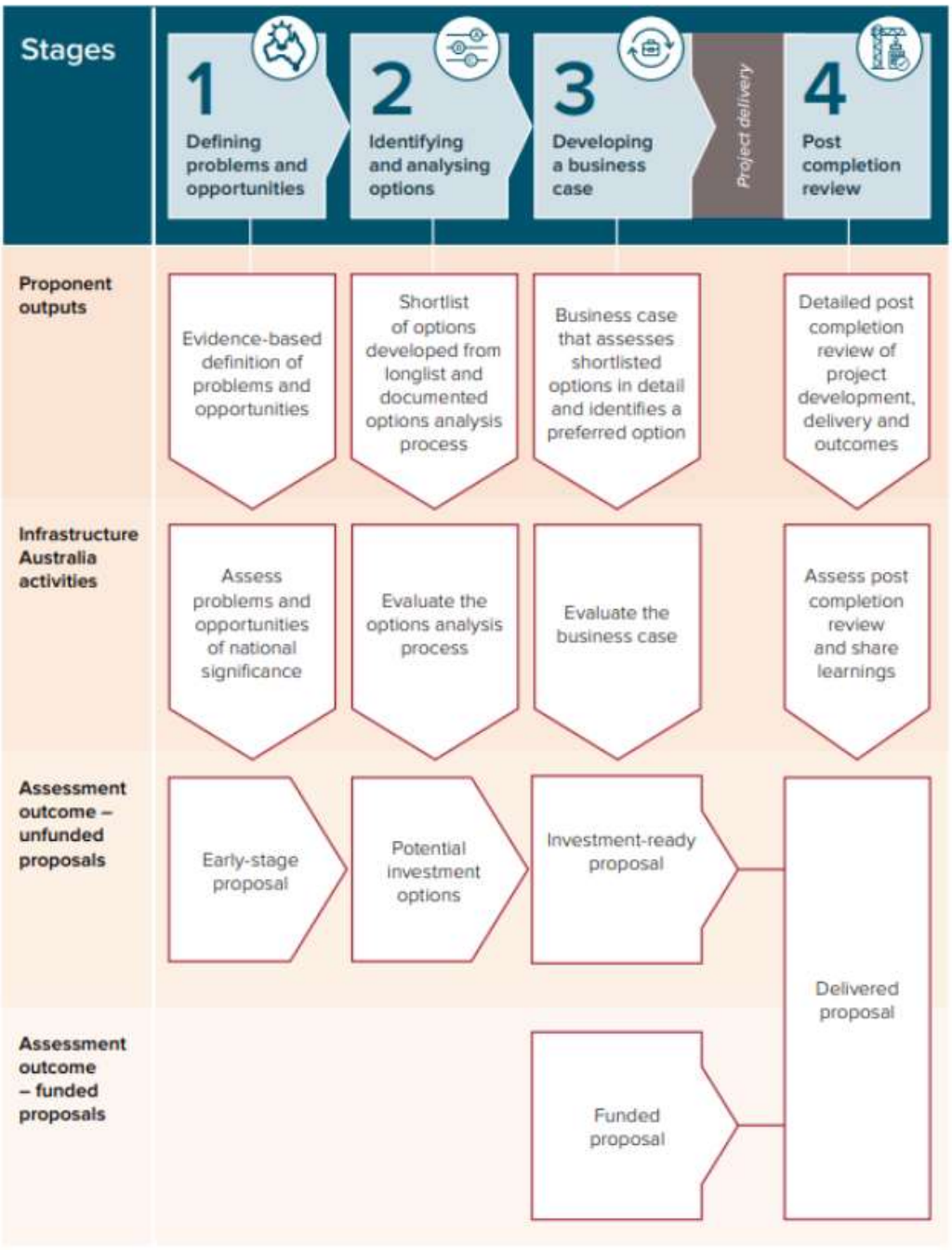
Figure 1 below sets out the key three assessment criteria that are used by IA at each assessment stage. Each criterion is accompanied by supporting themes that assessors consider through a structured workbook. The supporting themes have helped ensure assessments are well-rounded, and they have also helped IA push back against stakeholder perceptions that they are focused only on CBA results.

Figure 1 Assessment criteria and supporting themes

Source: Infrastructure Australia (2021), p. 21

Figure 2 below sets out each stage of the IAAF, along with the activities and outputs from IA.

Figure 2 Assessment Framework stages



Source: Infrastructure Australia (2021), p.35

Infrastructure New South Wales

Key takeaways for the New Zealand context

- **Risk-based assessments** – using a matrix of cost and risk has helped ensure assessments are robust but not overly burdensome for smaller and simpler projects.
- **Early influence** – mandated gates at initial project stages enable Infrastructure NSW (INSW) to influence project outcomes while early planning is still underway.
- **Easy-to-understand outcomes** – while the traffic light rating system can overly simplify project complexities, it is easy to understand and strongly incentivices stakeholders to avoid 'red lights'.
- **Delivery risk focus** – INSW's focus on optimising project outcomes and reducing delivery risk means that even if government funds a project that is not value-for-money, it is helping improve infrastructure outcomes.

Organisation overview

INSW was established in 2011 through legislation to provide independent infrastructure advice to the NSW Government. This includes risk-based project assurance and broader strategic advice. INSW provides gateway assurance review findings into NSW Government Cabinet decision-making processes, as well as regular reporting on portfolio and sector performance.

Framework overview

The Infrastructure Investment Assurance Framework (IIAF) sets out the risk-based assurance process, which categories projects into 4 tiers (where Tier 1 is highest priority and risk) based on a qualitative risk score and the estimated total cost of the project. The IIAF has seven gates (i.e., review stages, including an initial go/no go stage) but the project tier dictates which gates are mandatory or optional. Seven Key Focus Areas (KFAs) are used to assess projects across all gates, with no weightings applied. INSW issues recommendations to project sponsors after each gateway review, which they are required to initially respond to and then provide ongoing updates on.

Process overview:

Case study scorecard:

Rigour	Adaptability	Influence
• Project assessments cover entire project lifecycle. • There can be additional reviews through health checks and deep dives to tackle project-specific issues. • Consistent review areas, with increasing requirements for project maturity and risk levels. • Focus is usually on optimising projects over blocking projects.	• Review process is tailored to project scale, maturity and risk levels. • INSW and project proponents have opportunity to nominate additional focus areas for review. • Traffic light ratings and review recommendations provide different options for raising issues.	• Assurance has direct reporting line to Ministers and the Expenditure Review Committee. • Evaluation findings are supported by recommendations that proponents must respond to and provide regular updates on. • Senior stakeholders are highly conscious of poor traffic light ratings.

Note: ● indicates a high score and O indicates a low score

Framework description

The IIAF has seven gates for project assessment. Prior to this, projects are registered with INSW, and the project tier is calculated based on its cost and a qualitative risk rating. Gates 0 to 3 are for project planning:

- **Gate 0 (Go/No Go):** Projects must define and describe the underlying problem, demonstrate alignment to government policy and describe governance for project development. This is typically qualitative information.
- **Gate 1 (Strategic Options):** Projects must demonstrate a range of options have been identified and thoroughly assessed, typically through a strategic business case. Strategic cost-benefit analysis is required, alongside consideration of deliverability aspects and readiness for final business case development.
- **Gate 2 (Strategic needs):** Projects must justify the preferred option, typically through a detailed business case. This includes cost-benefit analysis and detailed deliverability considerations. INSW publishes a business case summary for projects over $100 million AUD with an investment decision by government.

At each gate (apart from Gate 0), projects are rated against seven KFA:

- Service need
- Value for money and affordability
- Social, economic and environmental sustainability
- Governance
- Risk management
- Stakeholder management
- Asset owner's needs and change management

Review teams qualitatively score each KFA as strong (green), satisfactory (amber) or weak (red), and give an overall project rating. 'Service need' is equivalent to strategic alignment, as it considers alignment to government policy as well as drivers for change. 'Value for money and affordability' uses cost-benefit analysis with a focus on ensuring the preferred option is the most justifiable and that whole-of-life costs have been considered.

These ratings are included in a detailed report that is provided to ERC, along with gateway recommendations that are categorised as: Suggested, Essential (do by a certain date), or Critical (do now). Projects cannot proceed through a gate with outstanding critical recommendations. NSW Treasury will still undertake its own review of business cases, typically focusing on the case for government intervention, the economic appraisal and the financial impacts.

Key strengths and advantages:

- **Project and portfolio risk** – the deliverability focus of reviews help tackle and reduce project- and portfolio-level risk for government. While projects are not strictly prioritised against each other, the risk ratings do enable government to focus funding on more robust projects and avoid (or cautiously proceed with) higher risk projects. Portfolio-wide reporting and tracking also helps identify sector and systemic risks.
- **Streamlined requirements** – the seven KFA are supporting guidance and provide guidance on what projects need to demonstrate but are not overly prescriptive with the approach or tools (instead referring to existing agency guidelines). This avoids guidance duplication or conflict, and instead leverages the knowledge of expert reviewers to identify issues and best practice.
- **Relationship to NSW Treasury** – INSW has established strong working relationships with NSW Treasury, potentially aided by its focus on optimising project outcomes and reducing risk, as opposed to challenging fundamental project need.

Key limitations:

- **Quantitative needs assessment** – IIAF does not require quantitative infrastructure gaps/needs analysis, so this is typically qualitative and less robust in early stages.
- **Review consistency** – Each review is heavily influenced by the expert panel appointed. While sector-specific experts are usually chosen, it can lead to inconsistencies in the level of analysis, severity of ratings and nature of the recommendations.
- **Resource intensity** – The number of gates and projects means that these reviews are highly resource-intensive and costly for INSW.
- **Transparency** – published business case summaries for funded projects are high-level and benign, and no summaries are published for projects assessed at gate 0 or gate 1.

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NSW Treasury (2022), TPG22-12 NSW Gateway Policy, accessible at: https://www.treasury.nsw.gov.au/documents/tpg22-12-nsw-gateway-policy

Other relevant material/extracts

We have extracted some key artefacts from INSW's IIAF for reference.

Figure 1 below shows the weighted risk score matrix that INSW uses to assign project tiers. The vertical axis is a weighted risk score, which is based on a qualitative assessment of risks completed by INSW. The horizontal axis is the estimated total cost of the project. This approach is fairly simple to implement and helps ensure that the assurance for each project is commensurate with its complexity and cost. There are also opportunities to change project tier in response to project matters.

Figure 1 INSW project-tier weighted risk score matrix

Weighted Risk Score	ETC Range				
	$10M – 50M	$50-$100M	$100M - $500M	$500M - $1B	>$1B
0.0 – 2.0	Tier 4	Tier 3	Tier 3	Tier 3	Tier 2
2.1 – 2.2	Tier 4	Tier 3	Tier 3	Tier 2	Tier 2
2.3 – 2.4	Tier 4	Tier 3	Tier 2	Tier 2	Tier 2
2.5 – 2.9	Tier 3	Tier 2	Tier 2	Tier 2	Tier 1 – HPHR
3.0 – 3.9	Tier 2	Tier 2	Tier 2	Tier 2	Tier 1 – HPHR
4.0 – 5.0	Tier 1 – HPHR	Tier 1 – HPHR	Tier 1 – HPHR	Tier 1 – HPHR	Tier 1 – HPHR

Source: INSW (2022), *Infrastructure Investment Assurance Framework*, p. 26

Figure 2 below shows how the project tier impacts on gateway requirements. Notably, certain gates may not be mandatory for lower-tier projects, but these projects can still choose to go through these gates.

Figure 2 INSW gateway requirements by project tier

GATEWAY REVIEWS	Tier 1 - HPHR	Tier 2	Tier 3	Tier 4	Tier 5
Gate 0 Go/No Go	Mandatory^	Mandatory^	Mandatory^		
Gate 1 Strategic Options	Mandatory	Mandatory	Optional		
Gate 2 Business Case	Mandatory	Mandatory	Optional		
Gate 3 Readiness for Market	Mandatory	Optional	Optional	Not required	Not required
Gate 4 Tender Evaluation	Mandatory	Optional	Optional		
Gate 5 Readiness for Service	Mandatory	Optional	Optional		
Gate 6 Benefits Realisation	Mandatory	Optional	Optional		
HEALTH CHECKS	**Tier 1 - HPHR**	**Tier 2**	**Tier 3**	**Tier 4**	**Tier 5**
Development	Optional	Optional	Optional		
Procurement	Optional	Optional	Optional	Not required	Not required
Delivery	Mandatory[24]	Optional	Optional		
DEEP DIVES	**Tier 1 - HPHR**	**Tier 2**	**Tier 3**	**Tier 4**	**Tier 5**
Any Phase	Optional	Optional	Optional	Not required	Not required

Source: INSW (2022), *Infrastructure Investment Assurance Framework*, p. 29

Korea

Key takeaways for the New Zealand context

- **Evaluation approach:** A weighted multi-criteria analysis (MCA) is used to combine a range of different inputs, including economics, policy alignment, and regional outcomes. The weightings are transparent and reduce the focus on a single output such as a benefit-cost ratio.
- **Sector specific guidelines:** Whilst the same general framework and steps apply to all projects, a number of sector-specific guidelines have also been developed.
- **Timing:** The agency undertakes the assessment closer to the start of the project development lifecycle. More detailed analyses are undertaken by line ministries once a budget decision has been made.
- **Independence**: An independent research institute undertakes the assessment on behalf of the Korean Ministry of Economy and Finance (MOEF), which promotes transparency and objectivity.

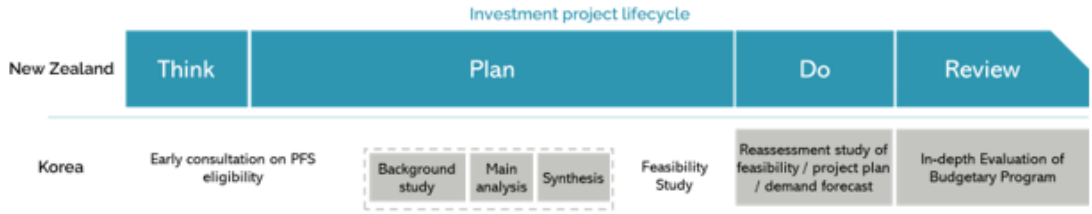
Organisation overview

The MOEF, also known as the Ministry of Strategy and Finance, is responsible for economic policy formulation, financial management, and fiscal affairs. Its primary role is to promote sustainable economic growth, ensure financial stability, and manage the country's fiscal resources. The MOEF evaluates new large-scale infrastructure and non-infrastructure (i.e., research and development, welfare) projects with total costs >$ 50 billion WON (about $60 million NZD).

Framework overview

The Preliminary Feasibility Study (PFS) provides an initial evaluation of a project to support budget decisions. The MOEF decides which projects will be subject to a PFS, based on ministry inputs, however, the analysis is undertaken by an independent organisation, the Korean Development Institute (KDI)'s Public and Private Infrastructure Investment Management Centre (PIMAC). The PFS analysis focuses on three key aspects: Economic Analysis, Policy Analysis, and Balanced Regional Development Analysis. An MCA is applied to combine quantitative and qualitative inputs and provide a weighted project score. Projects approved as part of the PFS process are then subject to a more detailed feasibility study undertaken by the relevant line ministry.

Process overview:



Case study scorecard:

Rigour	Adaptability	Influence
• The use of independent research provides objective outcomes and allows a fairer comparison. • Evaluation considers a wide range of factors including cost benefit analysis, alignment with government policy and regional economic impacts. • The MCA results in a project score that enables project comparison.	• The use of weightings within the MCA allows the importance of various aspects to change if government priorities change (i.e., regional development focus). • Several sector specific methodologies are used (i.e., airports, ports, IT, roads/railways, welfare, health, etc.). • Framework allows project specific characteristics to be explored.	• Projects are evaluated as feasible if the score from the MCA is > 0.5 (out of 1.0). • The MOEF communicates the outcomes from the PFS, and approved projects are subject to a (detailed) feasibility study undertaken by line ministries. • Research suggests some projects not recommended for budget allocation still receive budgets

Note: ● indicates a high score and O indicates a low score

Framework description

The purpose of the PFS is to evaluate projects from a national socio-economic viewpoint. There are three key components as part of the PFS:

- **Economic Analysis –** a standard economic analysis approach is applied drawing up key inputs including demand analysis, cost estimation, and benefit analysis. Sensitivity analysis is undertaken to assess the robustness of the economic outputs and a financial analysis is also required.
- **Policy Analysis –** the policy analysis explores consistency with broader government plans and policy directions, project risks, and employment effects. It also provides the opportunity to evaluate project specific policy outcomes. Strategic alignment against government plans and policies is qualitative but somewhat structured. Based on our review of evaluation reports, policies and plans are segmented into their relative importance (e.g. key nation-wide documents vs. local plans). Assesesors first consider whether a project is consistent or inconsistent with each policy/plan, and if so, then rate to what extent (e.g. somewhat, mostly or fully) they align.
- **Regional Development Analysis –** The regional development analysis considers key factors such as a regional backwardness index analysis and regional economic impacts.

Each of the three key components is combined as part of an MCA, known specifically as the **Analytic Hierarchy Process** (AHP). The AHP provides an overall assessment of feasibility, supports project prioritisation and guides budget decisions.

Within the three key components, there appears to be flexibility for reviewers to determine appropriate criterion and weightings. However, reviewers consult with industry experts and reviewers of similar projects to improve alignment of the assessment. Weightings between components of the AHP are determined through pair-wise comparisons, but there are guidelines with weighting bands for different sectors. This potentially balances nuance and project-specific characteristics with the need for consistency across a sector.

The PFS typically takes around six months, and outcomes from the PFS assessment are published by the MOEF in detailed public reports. There is also annual reporting on the project evaluation system, including data on the number of submissions, their sector, source and outcomes.

Key strengths and advantages:

- **Evaluation approach** – A cost-benefit analysis (CBA) is used to assess the economic feasibility of a project and is combined with other dimensions including policy issues and regional development outcomes.
- **PFS links directly to budget allocations** – The PFS provides high quality and independent information which directly supports budget allocation decisions.
- **Independence** – The use of an independent research institute provides a buffer from policy pressure and other influences over a project.

Key limitations:

- **Data limitations** - Whilst a detailed CBA is undertaken there is still an opportunity to improve the accuracy of key inputs to the analysis such as demand forecasting and project costs.
- **AHP Score** - The use of a rigid scoring approach (as per the MCA) may make it difficult to understand the relative strengths and weaknesses of different projects.

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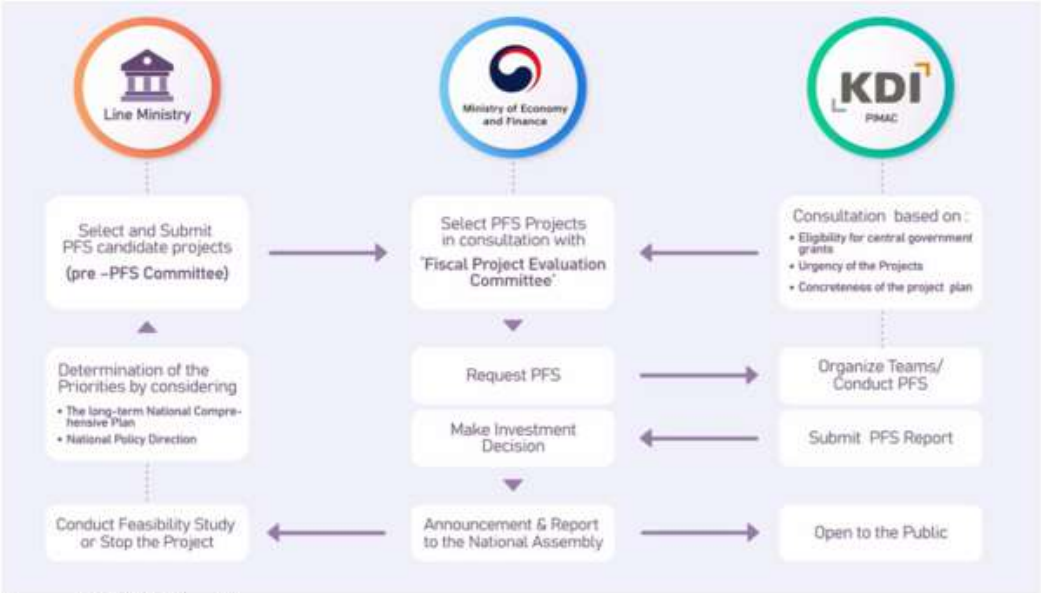
Other relevant material/extracts

We have extracted some key artefacts from Korea's KDI and PFS system.

Figure 1 sets out the role of the KDI (including PIMAC) relative to MOEF and the line ministries. Importantly, KDI has a role providing early advice to the MOEF on project urgency and the quality of initial project planning documentation. This is prior to its formal role in undertaking the PFS.

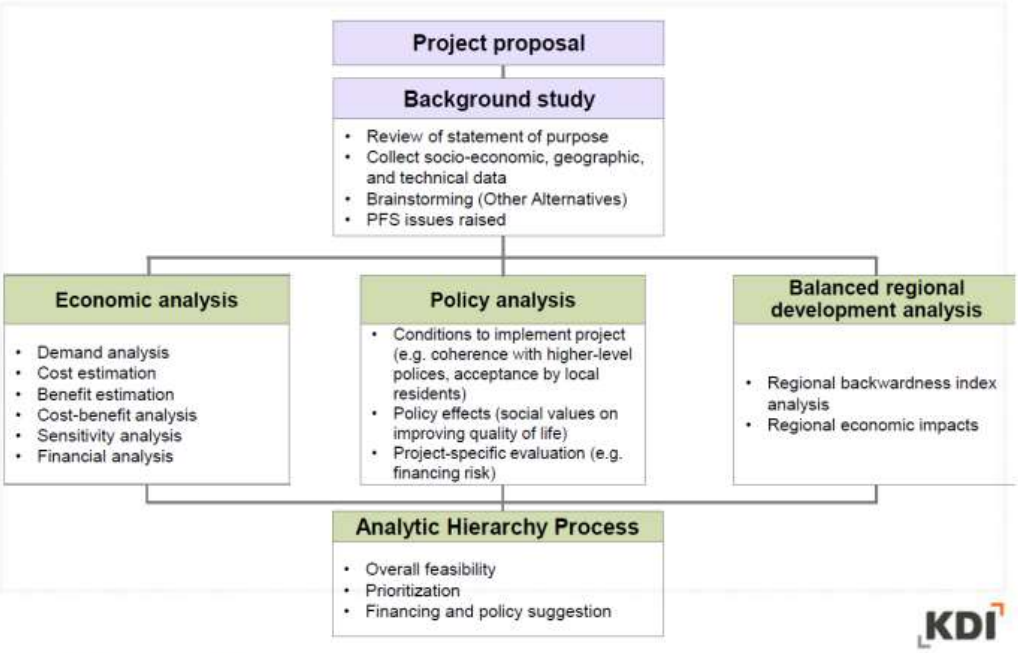
Figure 1 Role of the KDI in relation to other entities



Source: KDI (2022), p. 11

Figure 2 below summaries the PFS analysis and the three key analysis components. It shows the elements that are considered under each area and the concept of combining these into a single AHP score. This score not only determines feasibility but also relative priority.

Figure 2 Flowchart of PFS Analyses



Source: KDI (2022), p. 13

Figure 3 provides a more detailed breakdown of the evaluation description and standards that are used as inputs into the AHP process. Further detail is also available within the general PFS guidelines.

Figure 3 Description and scoring for AHP evaluation items

Evaluation Item	Evaluation Description	Scoring Standards	Remarks
Economic feasibility analysis	■ Project feasibility from an economic aspect	■ BCR, NPV, IRR, etc. resulting from analysis	■ The higher the BCR, the higher the project implementation score.
Balanced regional development analysis			
Level of regional development	■ Need for the project from the aspect of balanced regional development	■ Regional development index and ranking (Based on the level of development of the representative city .county if the project spans over multiple cities . counties)	■ The less developed the region, the higher the project implementation score; and the more developed the region, the lower the project implementation score.
Ripple effects on the regional economy	■ Ripple effects on the regional economy resulting from implementation of the project	■ $\frac{\text{Amount of added value within region}}{GRDP}$ and information collected in the study process is used for qualitative evaluation	■ The greater their share and the stronger the effects, the higher the project implementation score.
Policy analysis			
Consistency with policy and willingness to pursue projects			
Consistency with relevant plans and policy directions	■ Reflection of high-level and relevant plans ■ Consistency with policy directions pursued by the competent ministry	■ Qualitative evaluation of information collected in the study process	■ The more concretely they are reflected and the higher the consistency, the higher the project implementation score.
Determination to pursue projects and preference	■ Central government, local government, and local residents' willingness to pursue, preference for and level of long-standing demand for the project	■ Qualitative evaluation of information collected in the study process	■ The greater the determination, the higher the project implementation score; and the greater the opposition, the lower the project implementation score.
Project's preparedness	■ A project's concreteness such as a concrete plan, input of human and financial resources, etc.	■ Qualitative evaluation of information collected in the study process	■ The greater the preparedness, the higher the project implementation score.
Risk factors in pursuing projects			
Possibility of financing	■ Realizability of the financing plan	■ Qualitative evaluation of information collected in the study process	■ When there is no problem with financing, the AHP score is '1', and if there is a problem, the project implementation score declines.
Environmental nature	■ Rough evaluation of the project's impact on the surrounding environment and the possibility of environmental issues occurring when the project is implemented ■ Possibility of local conflicts due to environmental issues	■ Qualitative evaluation of information collected in the study process	■ When there is no problem with the environment, the AHP score is '1', and if there is a problem, the project implementation score declines.
Project-specific evaluation items			

Source: PIMAC (2008), p.172

World Banks's Infrastructure Prioritisation Framework

Key takeaways for the New Zealand context

- **Development of indices** – This case study provides a framework for evaluating two key components: social-environmental and financial-economic outcomes. A similar approach could be developed to evaluate strategic alignment and value for money. However, a key challenge to this approach would be the development of consistent indicators that would be applicable across all project types.
- **Stepping stone** – The case study provides a fairly adaptable framework for assessing large groups of projects, which could potentially be considered as an interim step towards a more comprehensive prioritisation system. It could also be applied to one-off investment challenges, such as disaster recovery.
- **Timing and budget** – The prioritisation typically occurs at the investment decision phase of the infrastructure lifecycle, with the outputs of the process helping to prioritise projects and understand what can be achieved within known budget constraints.

Organisation overview

The World Bank aims to promote sustainable infrastructure investment that contributes to economic growth, poverty reduction, improved service delivery, and enhanced quality of life in developing countries. It offers loans, grants, and guarantees to governments, public entities, and sometimes private sector partners to help fund infrastructure development. The World Bank also conducts project appraisals to assess the feasibility, sustainability, and potential impact of infrastructure projects.

Framework overview

The Infrastructure Prioritization Framework (IPF) is a quantitative multi-criteria decision tool that considers project outcomes along two dimensions: social-environmental and financial-economic. The IPF seeks to inform the selection of projects by combining selection criteria into social-environmental (SEI) and financial-economic (FEI) indices. These indices are used to plot projects on a Cartesian plane, and the sector budget is imposed to compare projects along each dimension. This approach is especially useful when there are a wide range of factors to consider beyond the cost-benefit analysis (CBA), or where a detailed CBA has not been undertaken.

Process overview:

Case study scorecard:

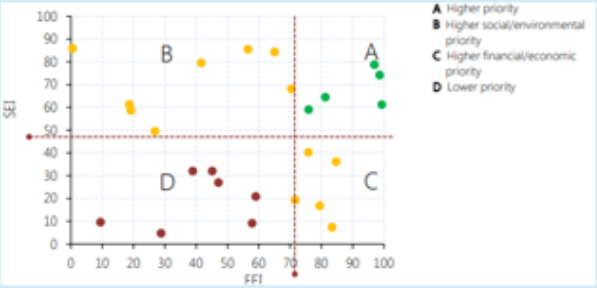
Rigour	Adaptability	Influence
• Largely dependent on the accuracy of estimating the indicators and indices. • Several steps are required to define the key indicators and how they will be evaluated or quantified, including quantification of any qualitative inputs and standardisation to ensure comparability.	• The SEI and FEI provide the flexibility to incorporate a range of different indicators or selection criteria. • The criteria can differ by sector, allowing sector-specific considerations to be incorporated. • Weightings can also be applied to reflect the relative significance or priority of different criteria.	• The IPF enables prioritisation of a group of projects against key social -environmental (SEI) and financial-economic (FEI) indices. • It is unclear how this method could be applied to a group of projects with varying sector focus or outcomes, though its underlying principles could potentially be applied.

Note: ● indicates a high score and O indicates a low score

Framework description

The IPF is a multi-criteria analysis (MCA) and prioritisation approach that allows for the comparison of projects against others within a sector. The key output is a graphical display of projects' relative performance along two axes, defined by the financial-economic and social-environmental composite index scores. The framework includes the following key steps:

- **Development of the IPF Indices** – The SEI and FEI indices consist of a range of indicators that can be chosen based on government policy goals (e.g., sectoral, economic, social, and environmental aims) and stakeholder consultation. To condense dissimilar data types and scales of measurement into indices, users must:
  - Transform qualitative data and quantitative data into usable data.
  - Standardise criteria measurements to a common scale.
  - Establish weights for each criterion.
  - Combine all variables using an additive model.
- **Prioritisation** – The SEI and the FEI composite indicators allow the ranking of projects within a sector, according to relative performance along each dimension. As illustrated, projects can be plotted on a two-dimensional Cartesian plane (with axes defined by the SEI and FEI scores) to determine high priority projects.



- **Evaluation of budget constraints** – Once projects are plotted, budget constraints can be considered.

The framework recommends pre-screening projects for strategic alignment before prioritising, based on a minimum criteria of consistency with strategic goals. However, it does not provide a specific tool/approach for this. It tests value-for-money through the indices and recommends using efficiency measures (e.g. beneficiaries per dollar spent) rather than absolute benefit to avoid a bias towards larger projects.

Key strengths and advantages:

- **Selection of indicators and development of indices** – The MCA analysis approach provides flexibility in the selection of indicators that are used to develop each of the indices. This provides the government with the opportunity to choose those indicators that align best with current policy goals and objectives. It also allows the evaluation of qualitative information within a quantitative framework.
- **Prioritisation** – The resulting SEI and FEI indicators provide a useful basis for the prioritisation of a set of sector-based projects and the identification of which priority projects fall within known budget constraints.
- **Value judgements** – The criteria weighting allows different levels of importance to be assigned to different criteria. For instance, the CBA results could have a high weighting, while still allowing some consideration of other factors such as scale of unquantified benefits.

Key limitations:

- **Sector-specific applications** – The framework appears to perform best on a sector-specific basis, where common indicators can be used across all projects within a sector. It is unclear how this approach could be applied across multiple sectors and projects with different focus areas and outcomes. Common project metrics may need to be used (e.g., CBA results, risk, cost) which may limit insights from the prioritisation process.
- **Complexity** – There is a level of complexity in the development of indices, particularly in developing a quantitative approach for evaluating qualitative data. There is a risk that some of the specific project nuances could get lost in the development of a score or indices. It also presents a challenge when most, but not all, projects have certain information available.

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Other relevant material/extracts

We have extracted some key artefacts from the World Bank's Infrastructure Prioritization Framework for reference.

Figure 1 below provides an example of the indicators that were used to develop the SEI index for a pilot of the framework in Sri Lanka, focusing on water supply projects. These range from project specific measures (e.g., jobs created per $ invested) to broader regional measures (e.g., average frequency of water-borne diseases). The figure also shows different potential weighting approaches, which is a key consideration for developing the SEI.

Figure 1 Example SEI indicators and weighting approaches used in Sri Lanka water supply pilot

INDICATORS	Contribution (as a %) of each indicator to the composite SEI score under different weighting schemes				
	Standard PCA*	PCA with weights>0	PCA with weights>min requirement	PCA weights using NPD rule	Simple Average
	(1)	(2)	(3)	(4)	(5)
1. Beneficiaries/US m$	0.055	0%	9%	15%	14.3%
2. Jobs created/US m$	0.574	27%	19%	9%	14.3%
3. Poverty level	0.082	12%	10%	15%	14.3%
4. Continuity of water supply	0.333	28%	24%	15%	14.3%
5. Bacterial quality of water	-0.479	0%	9%	9%	14.3%
6. Existing safe water coverage	0.564	30%	19%	24%	14.3%
7. Prevalence of water-borne diseases	-0.040	2%	9%	15%	14.3%
Total		100%	100%	100%	100%
% of data variance explained	33%	29%	22%	17%	16%

Notes: *The figures presented in this column are the originally calculated weights using the unrestricted PCA methodology

Figure 2 below provides the equivalent indicators and weighting approaches for the FEI in the same pilot program. This examples shows how the economic performance (through the benefit-cost ratio) is considered alongside other key indicators. In this situation, Non-revenue water provides a measure of need for projects that improve water infrastructure and management practices, while the Water Resources Yield criterion reflects implementation challenges based on water rights, water availability, and other deliverability considerations.

Figure 2 Example FEI indicators used in Sri Lanka water supply pilot

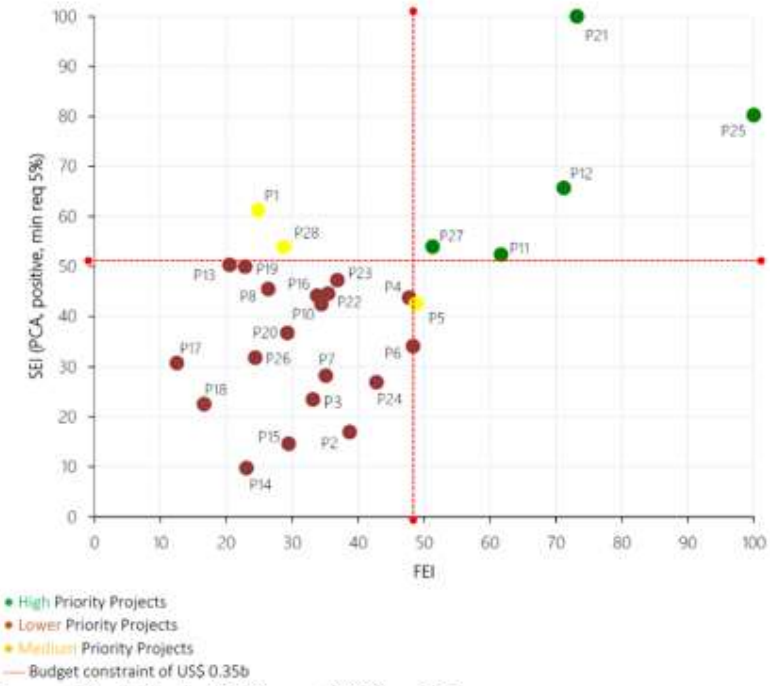
INDICATORS	Contribution (as a %) of each indicator to the composite FEI score			
	Weights from PCA*	Weights>0	Weights>min requirement	Simple Average
Non-revenue water	0.507	50%	16%	33.3%
Benefit Cost Ratio	0.508	50%	68%	33.3%
Water Resources Yield	-0.696	0%	16%	33.3%
Total		100%	100%	100%
% of data variance explained	49%	34%	28%	19%

Notes: *The figures presented in this column are the originally calculated weights using the unrestricted PCA methodology

Source: World Bank PPP Group (2018), p. 23

Figure 3 below provides an example of the prioritisation output for the Sri Lanka water supply project. While many international assessment and prioritisation approaches result in a binary outcome (i.e. recommended or not), this approach provides far more granularity. The red lines indicate the budget limits that have been superimposed onto the Cartesian plane. These budget constraints help define the quadrants and general ranking of projects, though relative priority could still be considered without showing the budget constraints.

Figure 3 Example IPF matrix for Sri Lanka water supply project



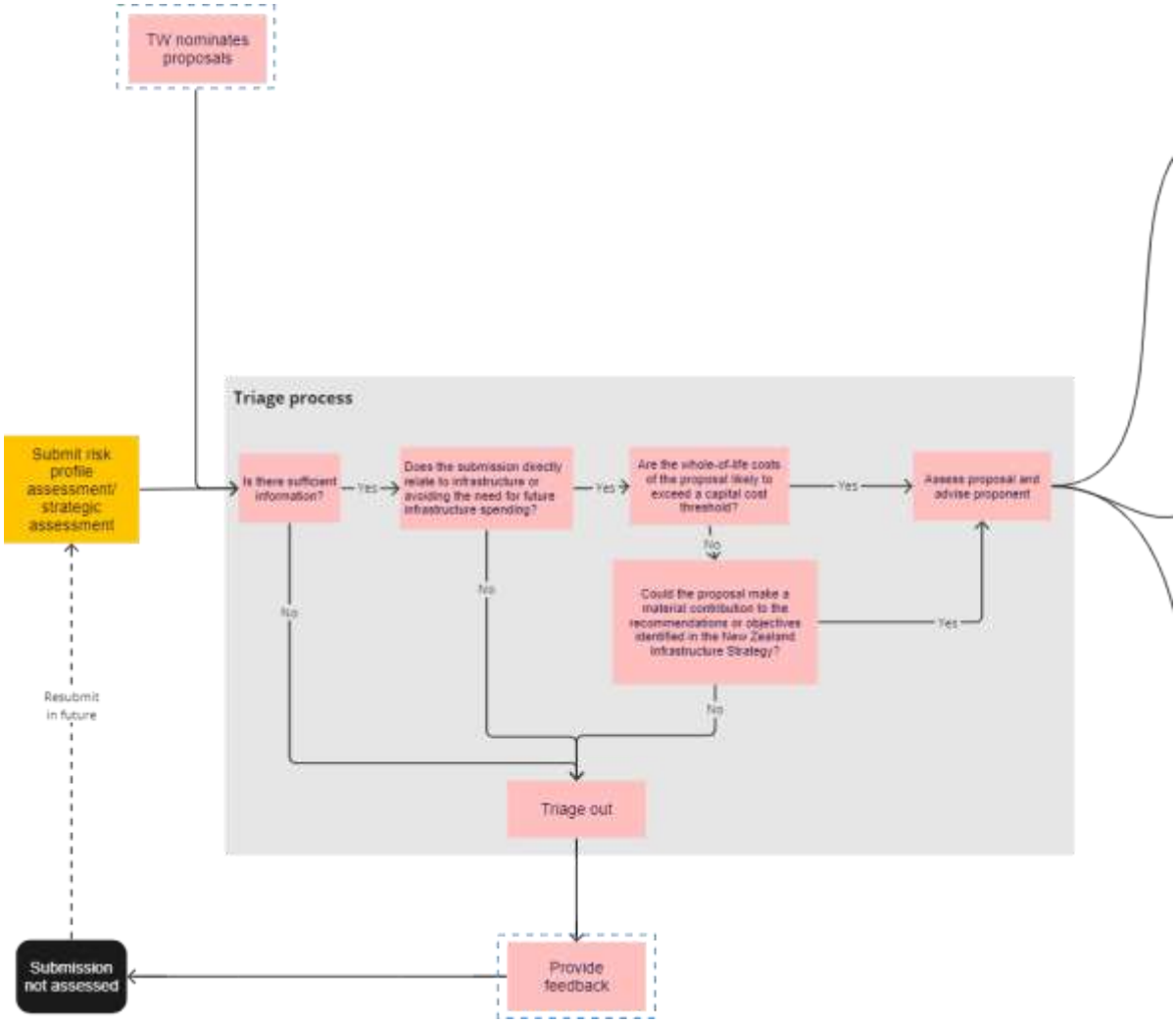
Source: World Bank PPP Group (2018), p. 27

Appendix B: Detailed Process Map for each assessment stage

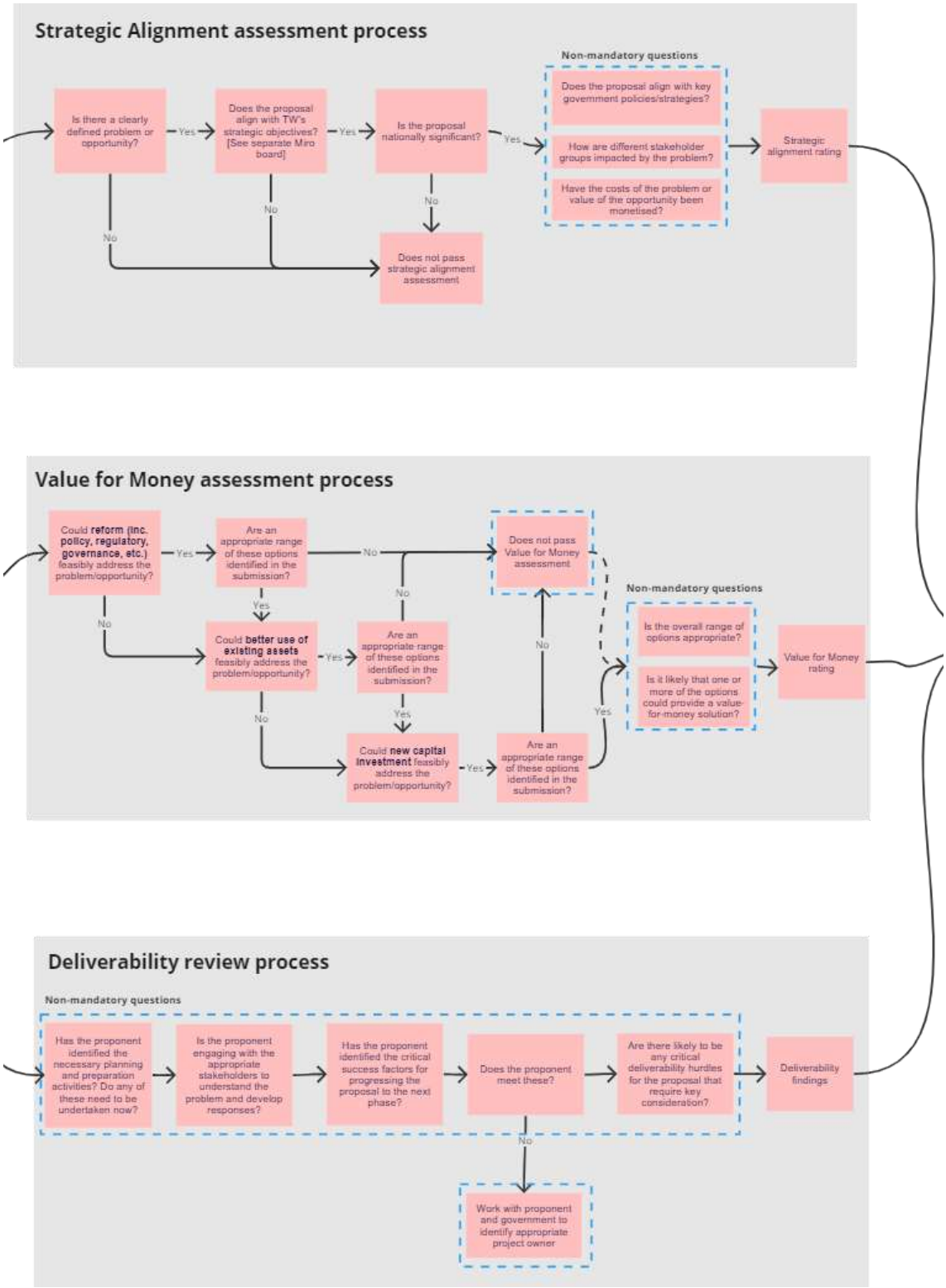
Miro board link: https://miro.com/app/board/uXjVM720oPw=/?share_link_id=964830807066

Stage 1

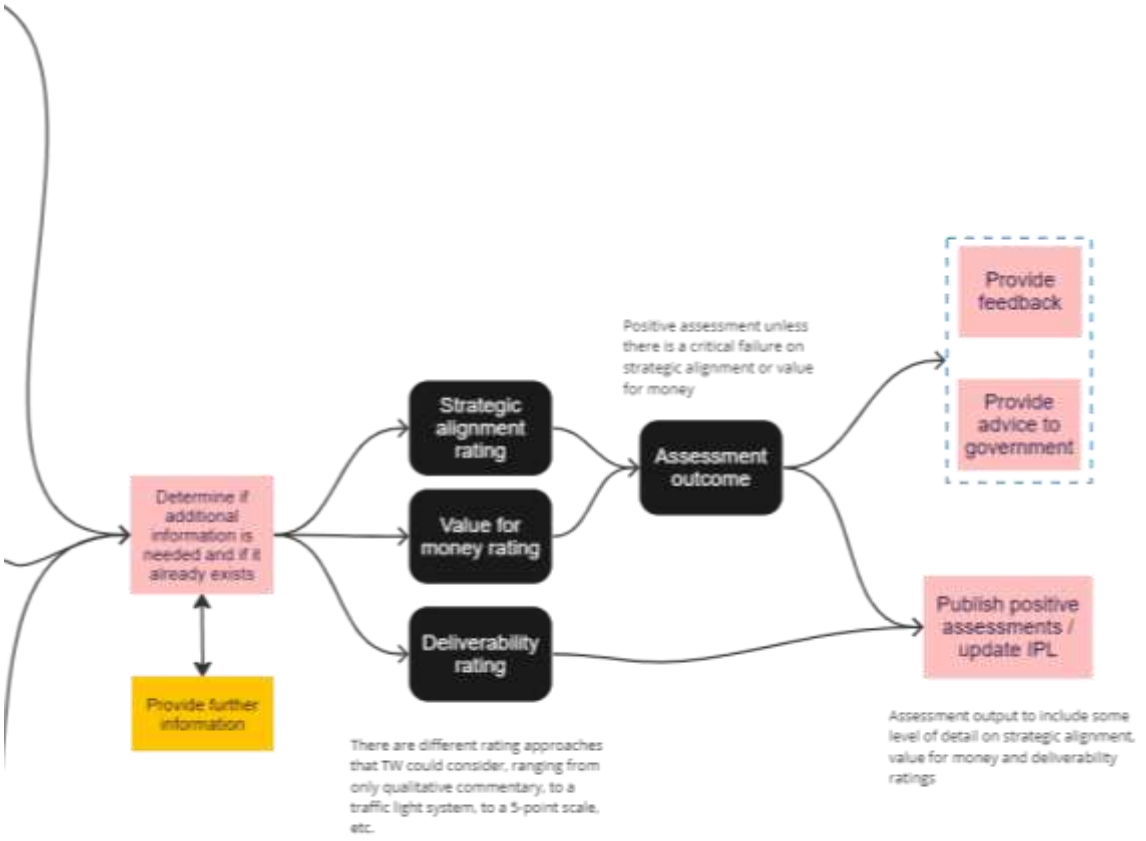
Submission and Triage



Stage 1 – Assessment criteria

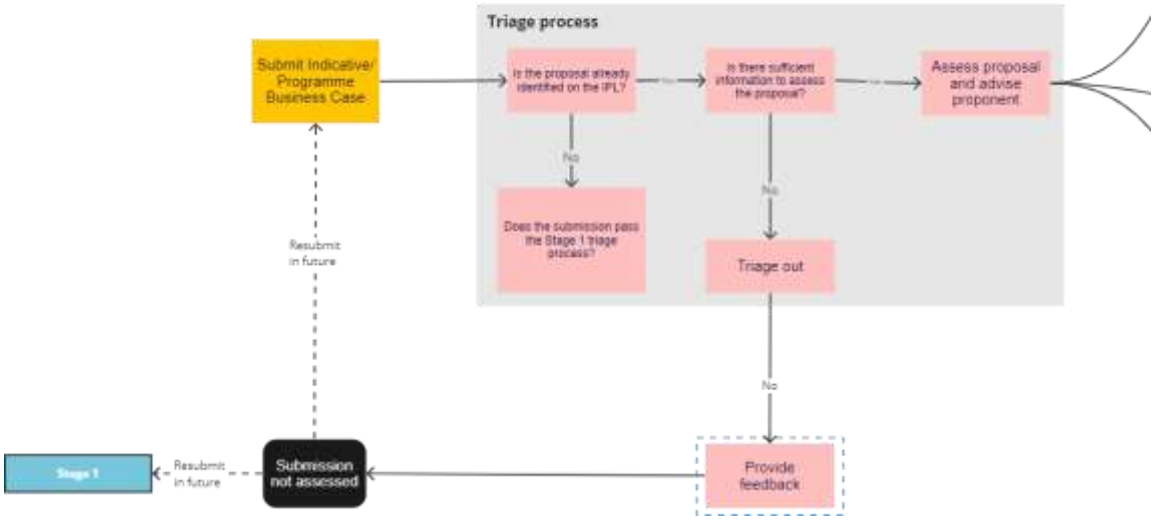


Assessment outputs

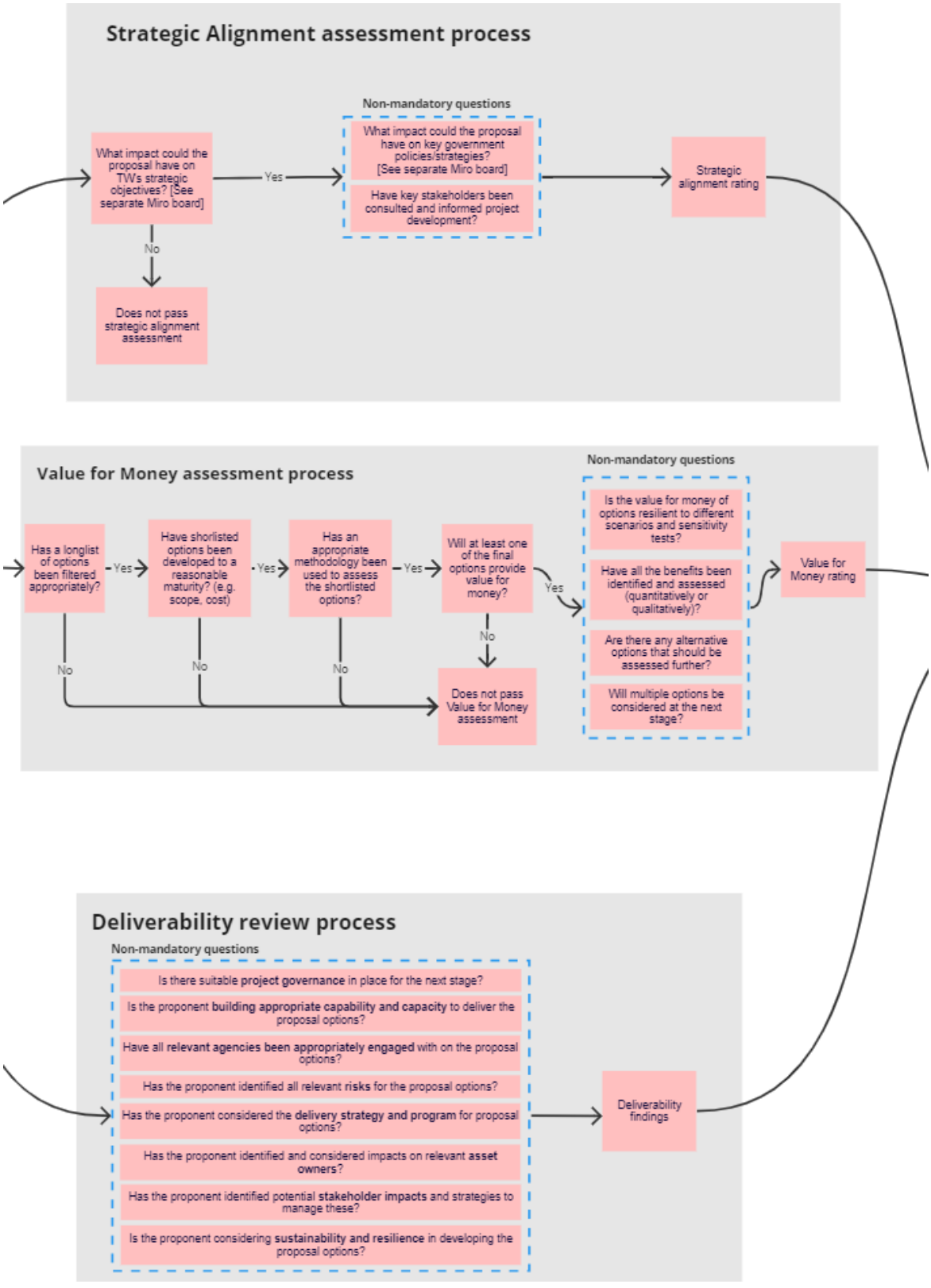


Stage 2

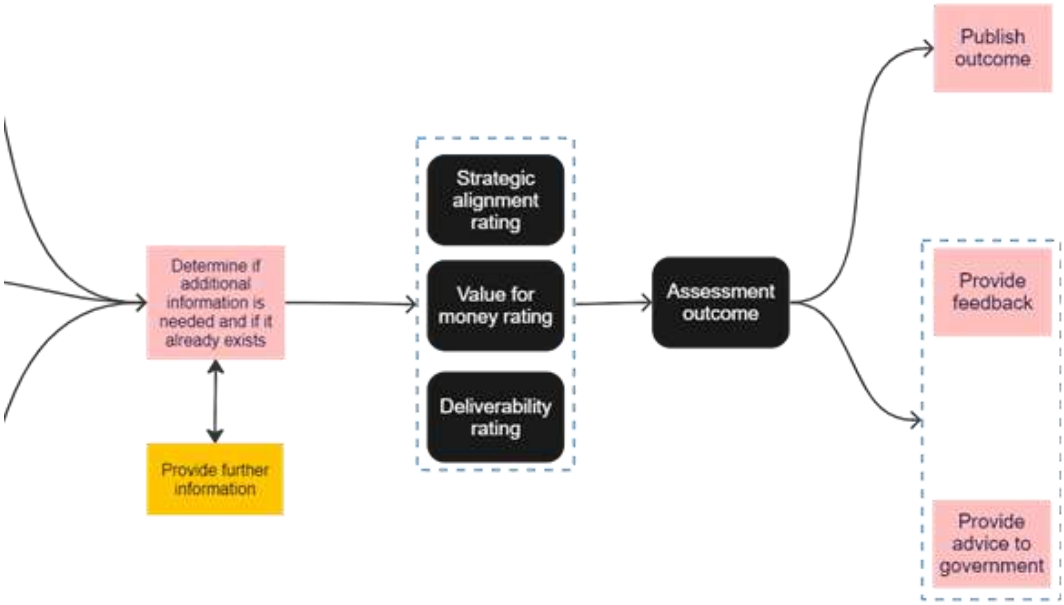
Triage



Assessment criteria

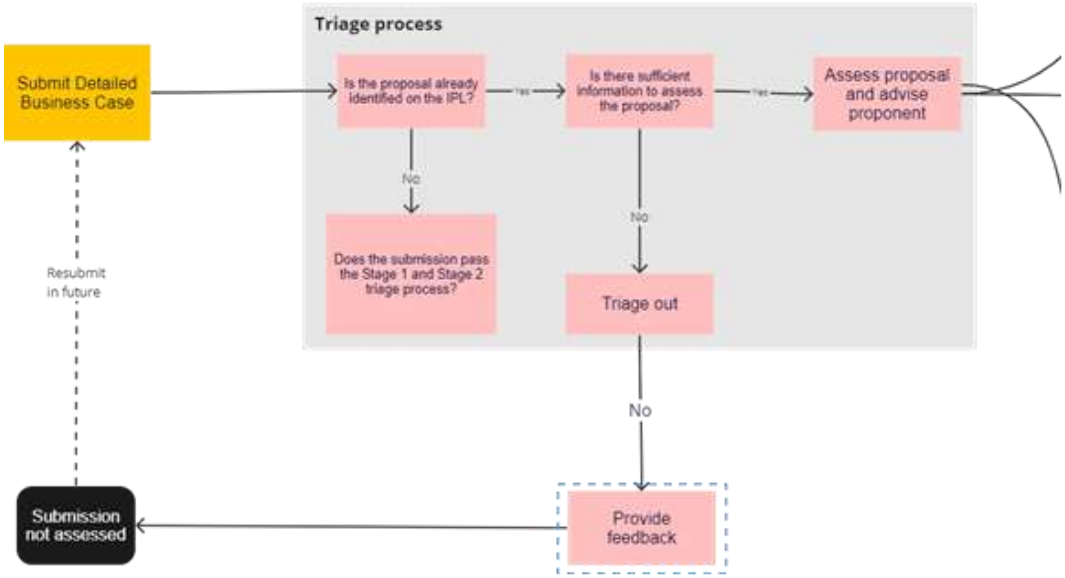


Assessment outputs

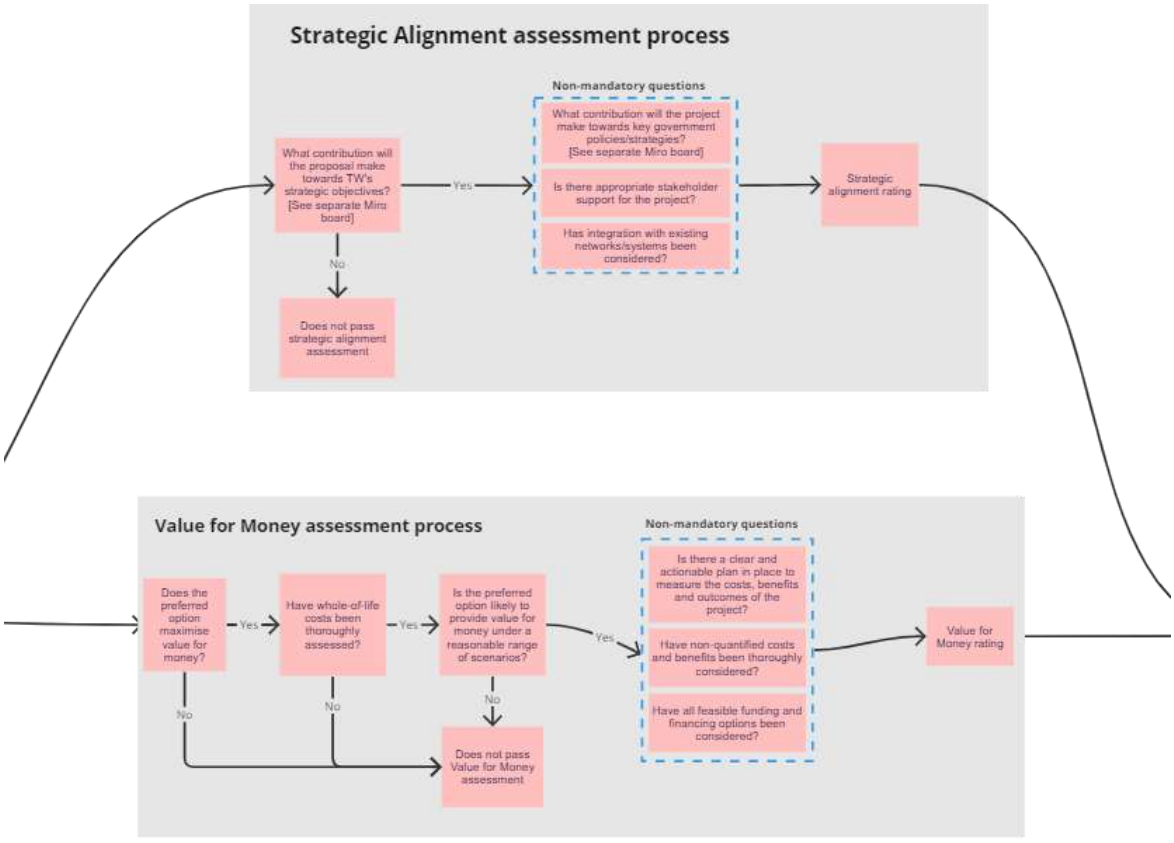


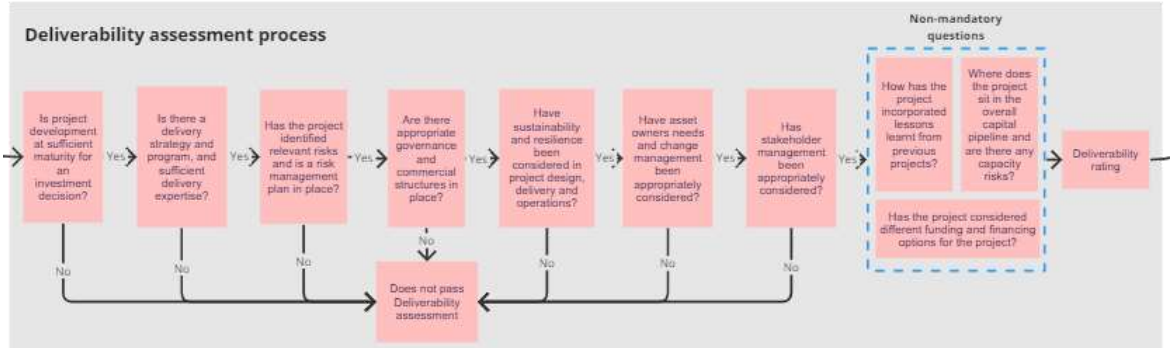
Stage 3

Triage

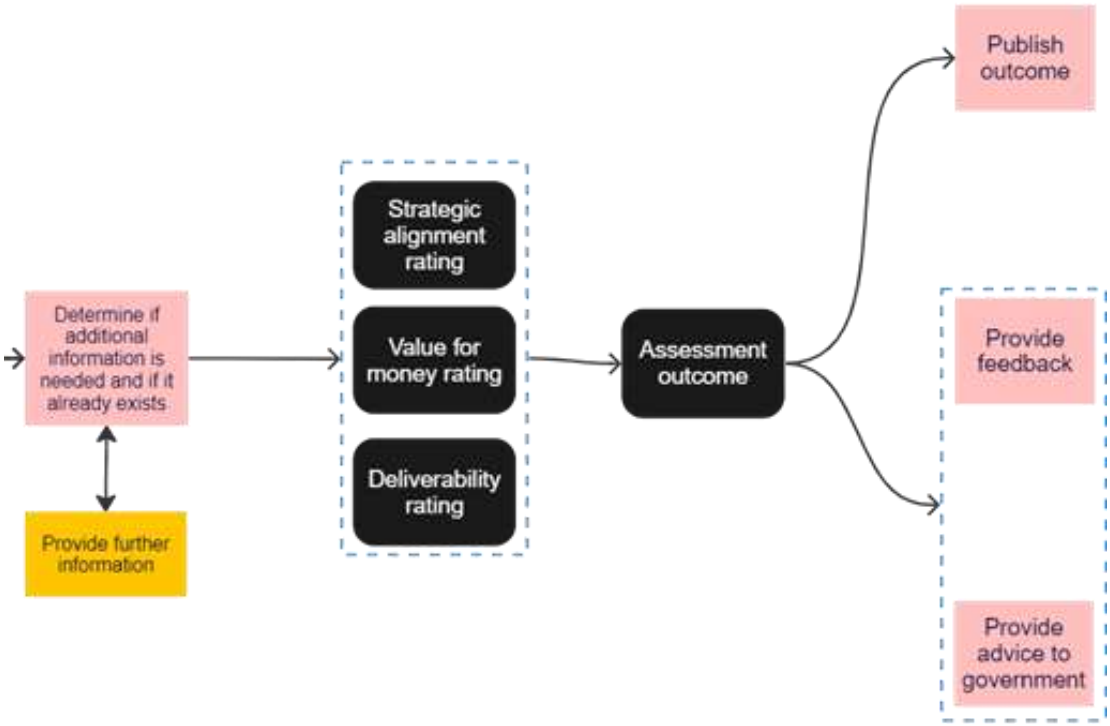


Assessment criteria





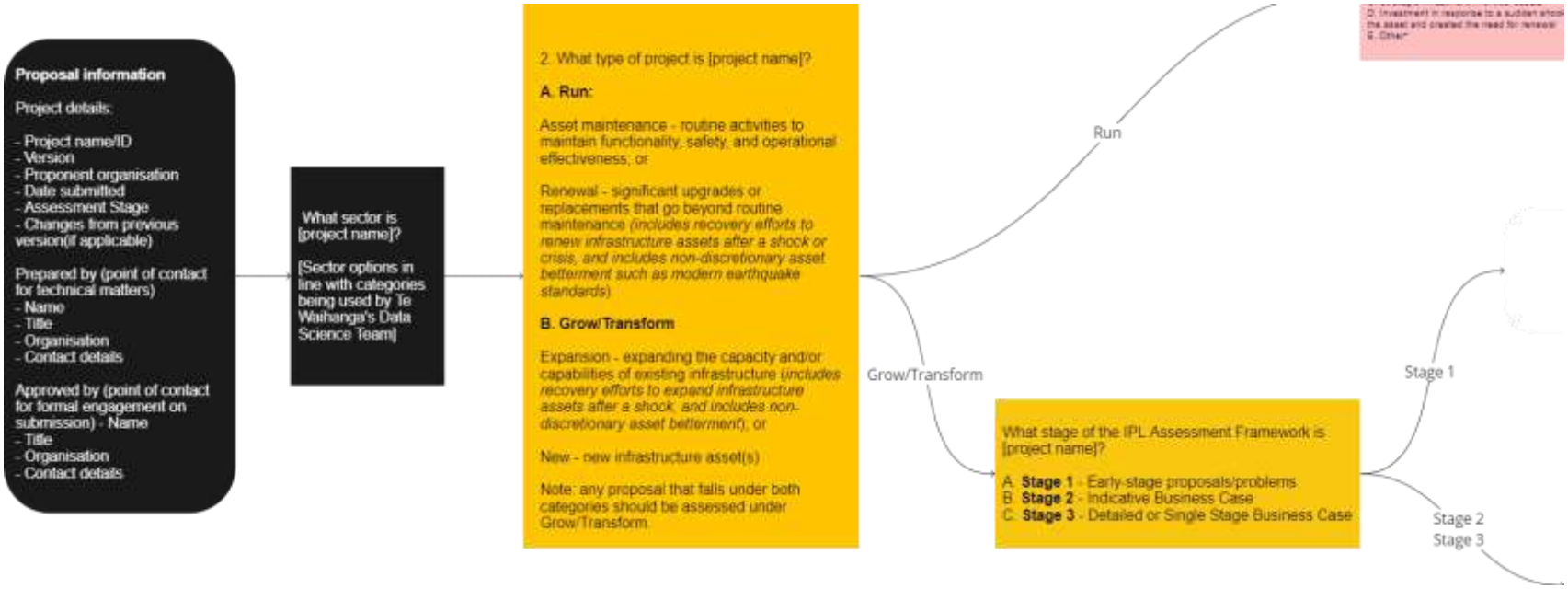
Assessment outputs



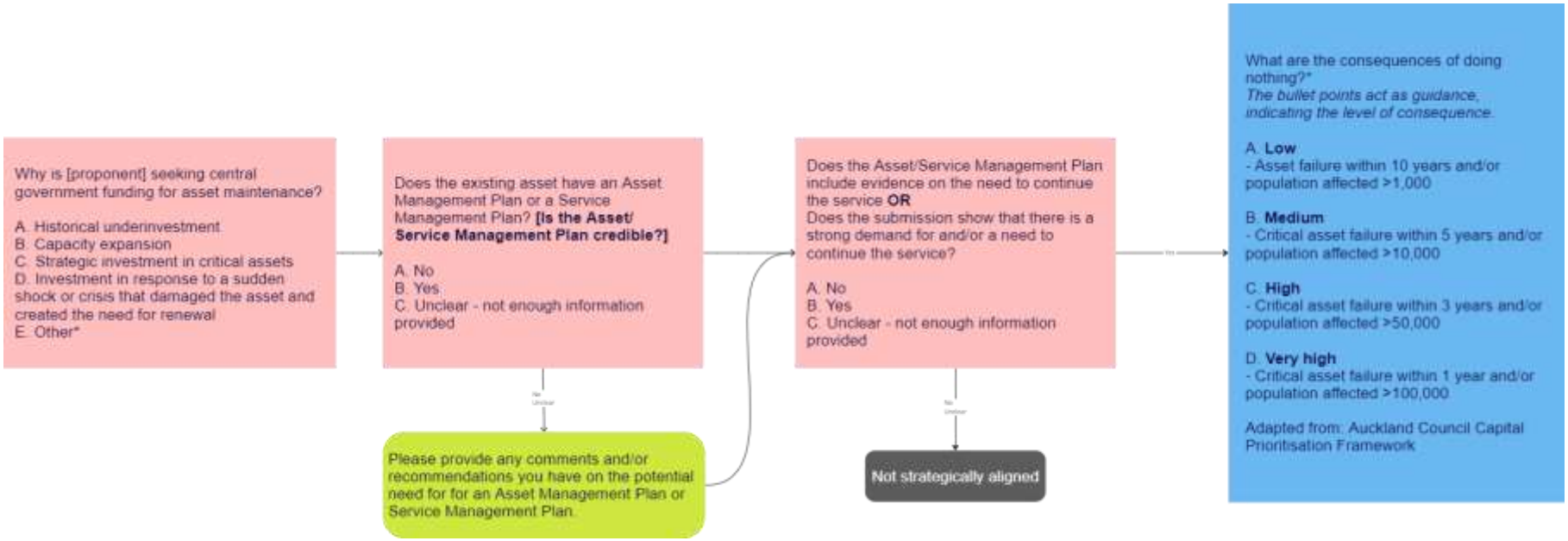
Appendix C: Tool for strategic alignment with Rautaki Hanganga o Aotearoa

Miro board link: https://miro.com/app/board/uXjVM_cvkcU=/?share_link_id=90281233893

Sorting gates



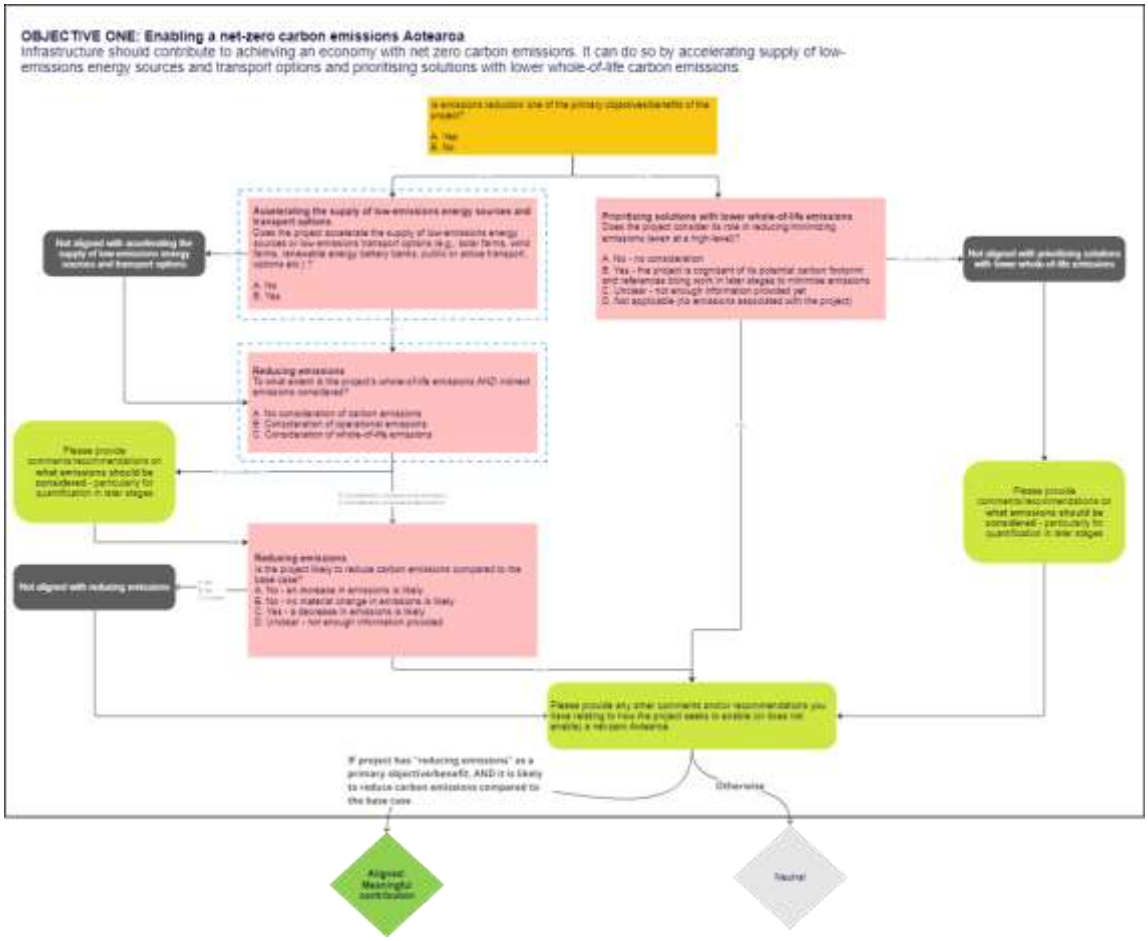
Assessing the strategic alignment of "run" projects



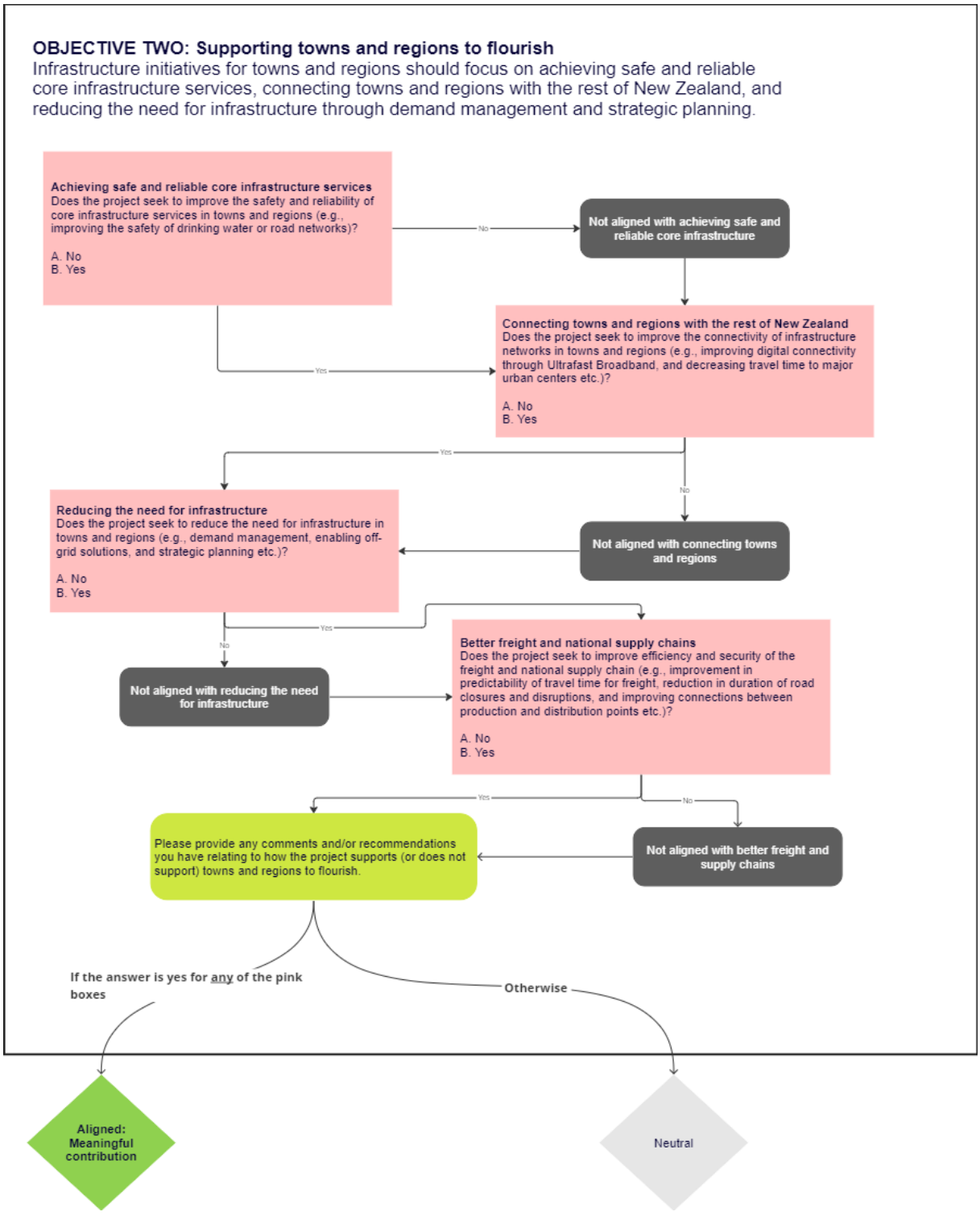
Assessing the strategic alignment of "grow/transform" projects

Stage 1

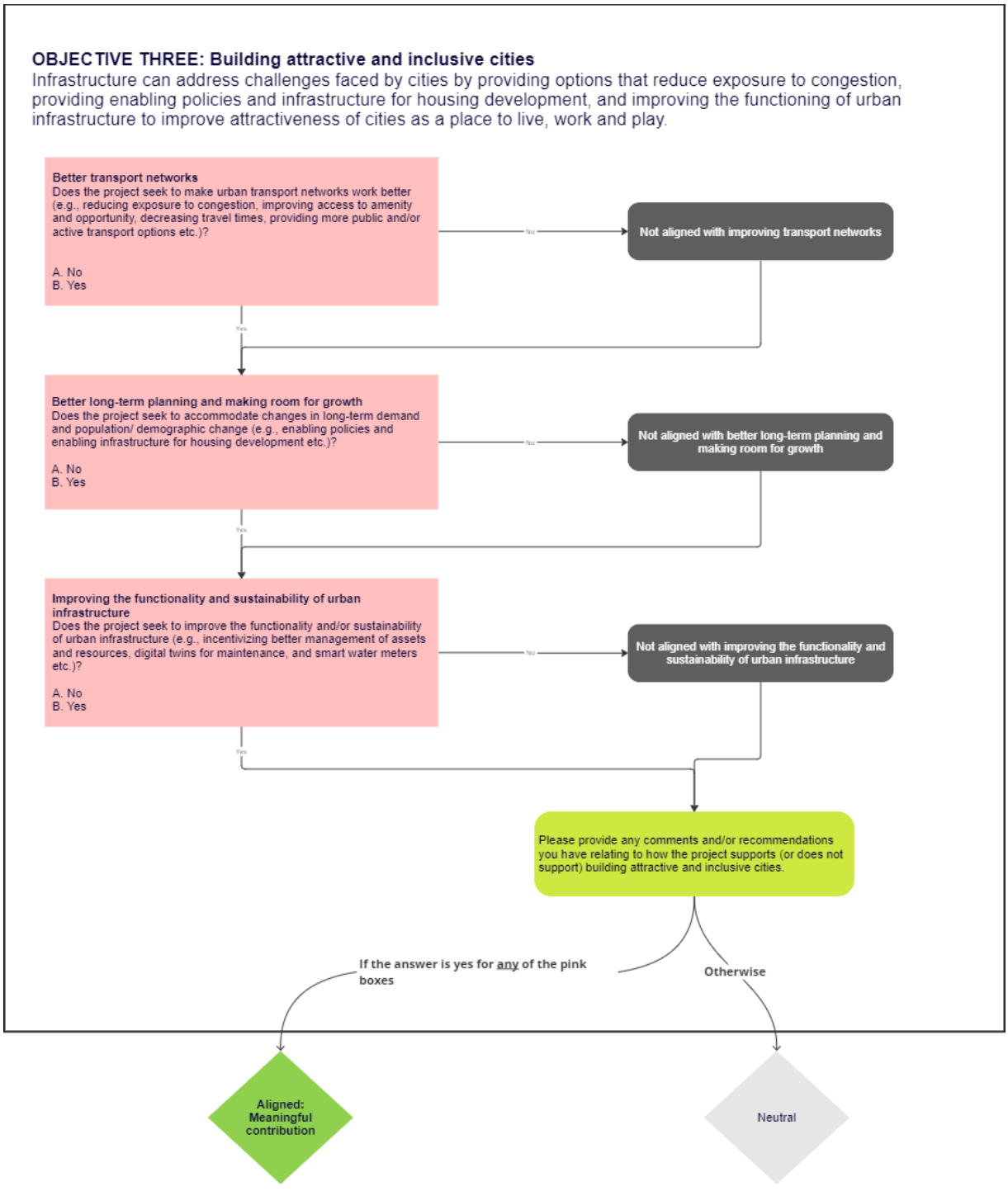
Objective One: Enabling a net-zero emissions Aotearoa



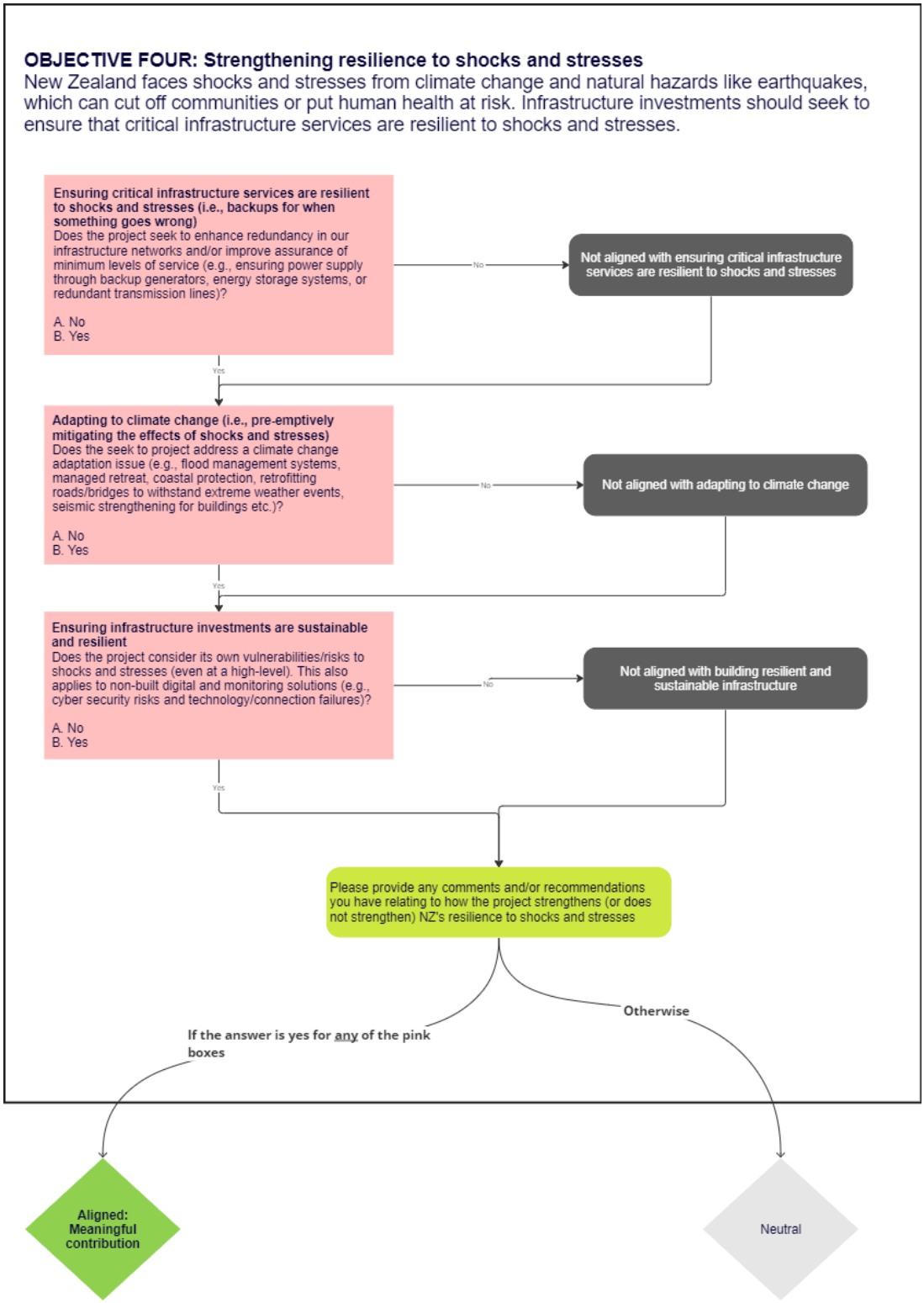
Objective Two: Supporting towns and regions to flourish



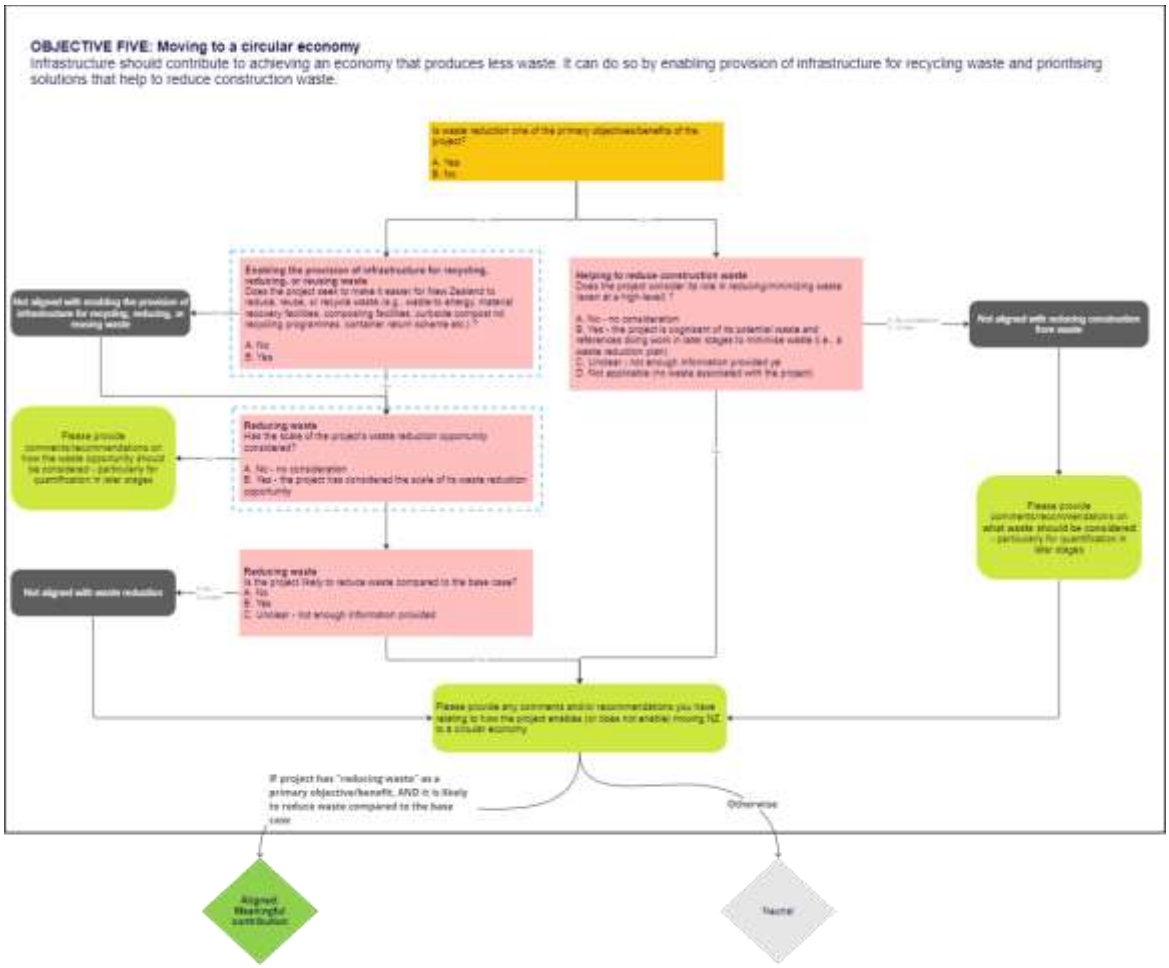
Objective Three: Building attractive and inclusive cities



Objective Four: Strengthening resilience to shocks and stresses

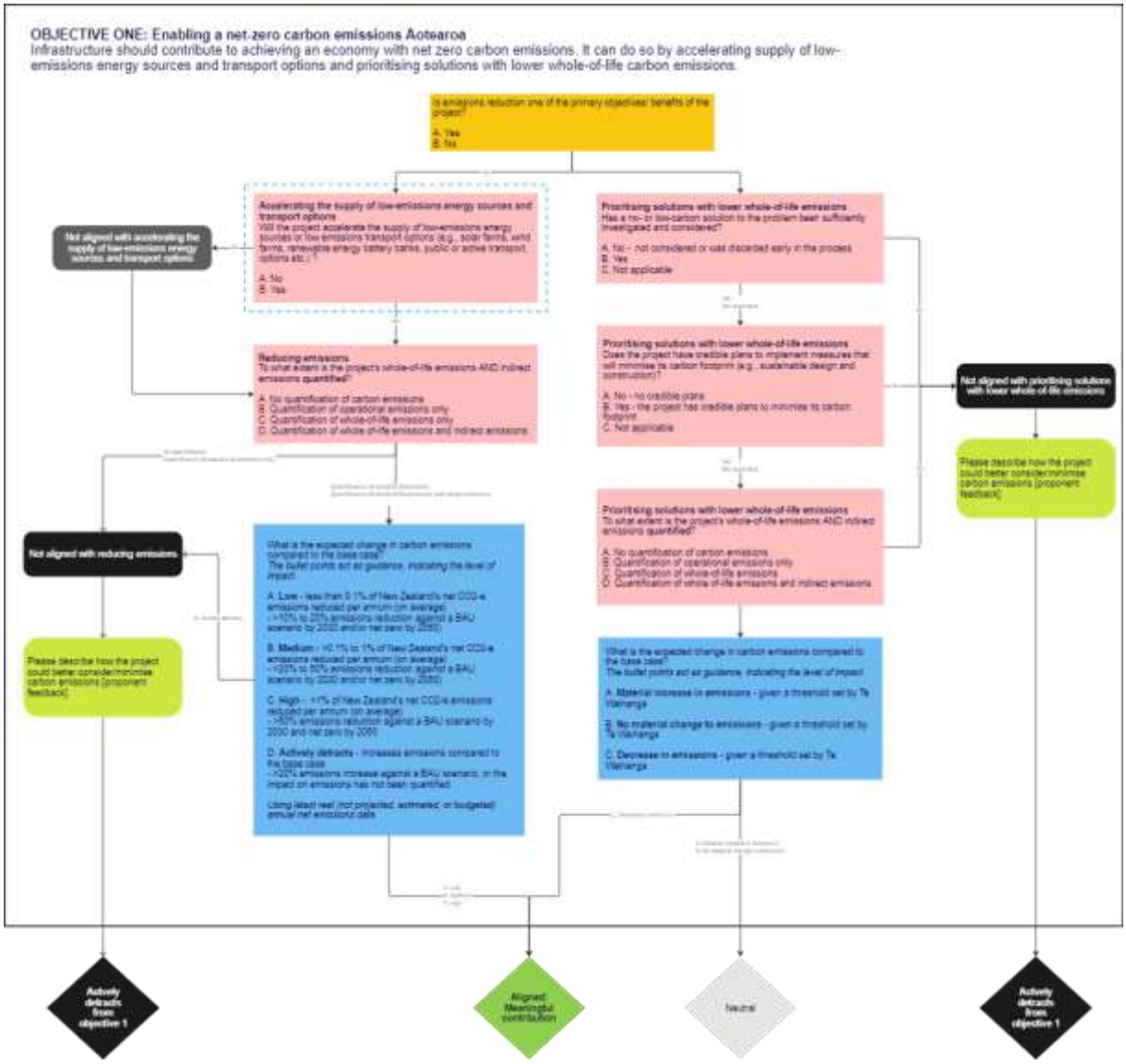


Objective Five: Moving to a circular economy

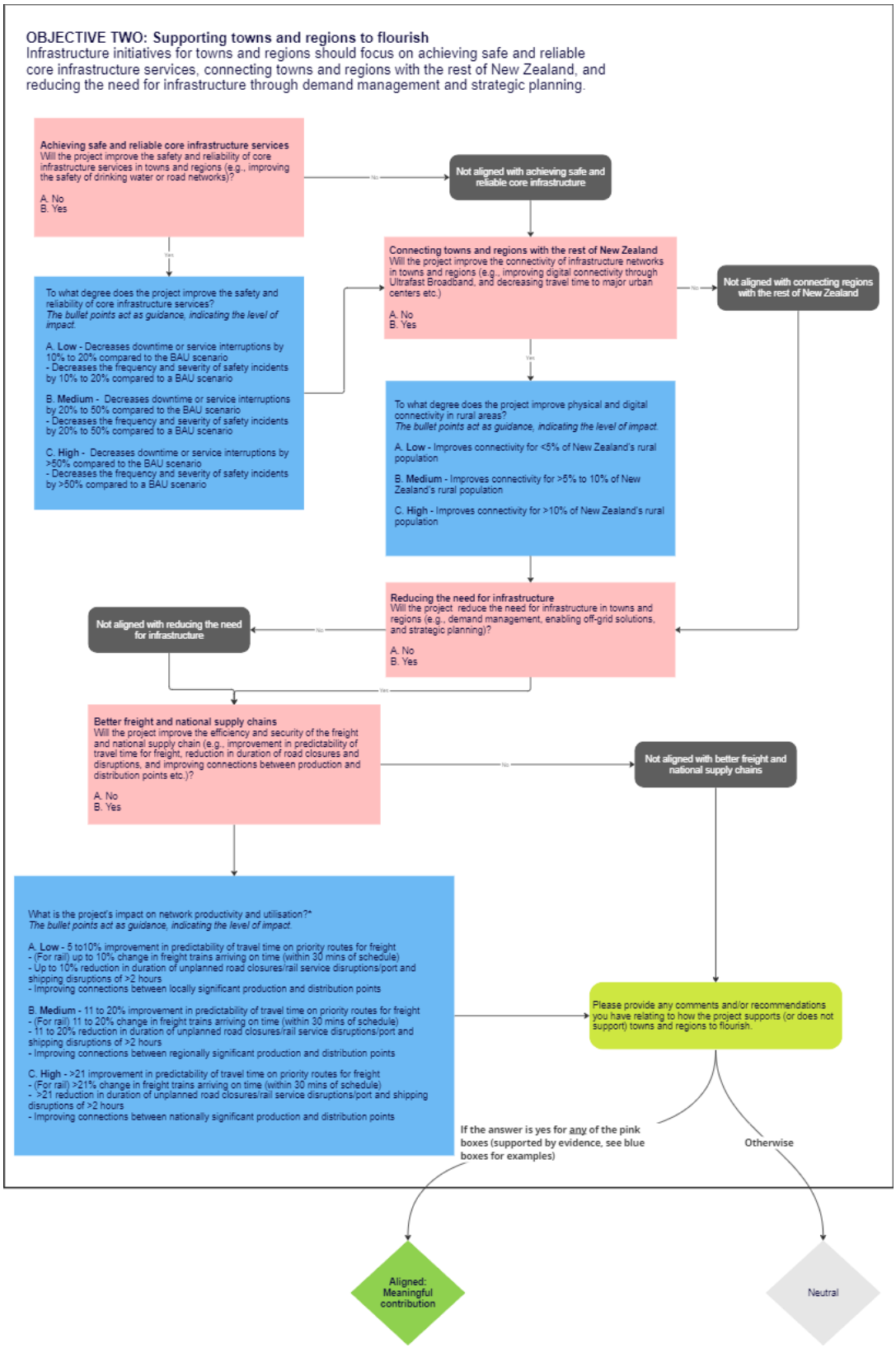


Stage 2 and Stage 3

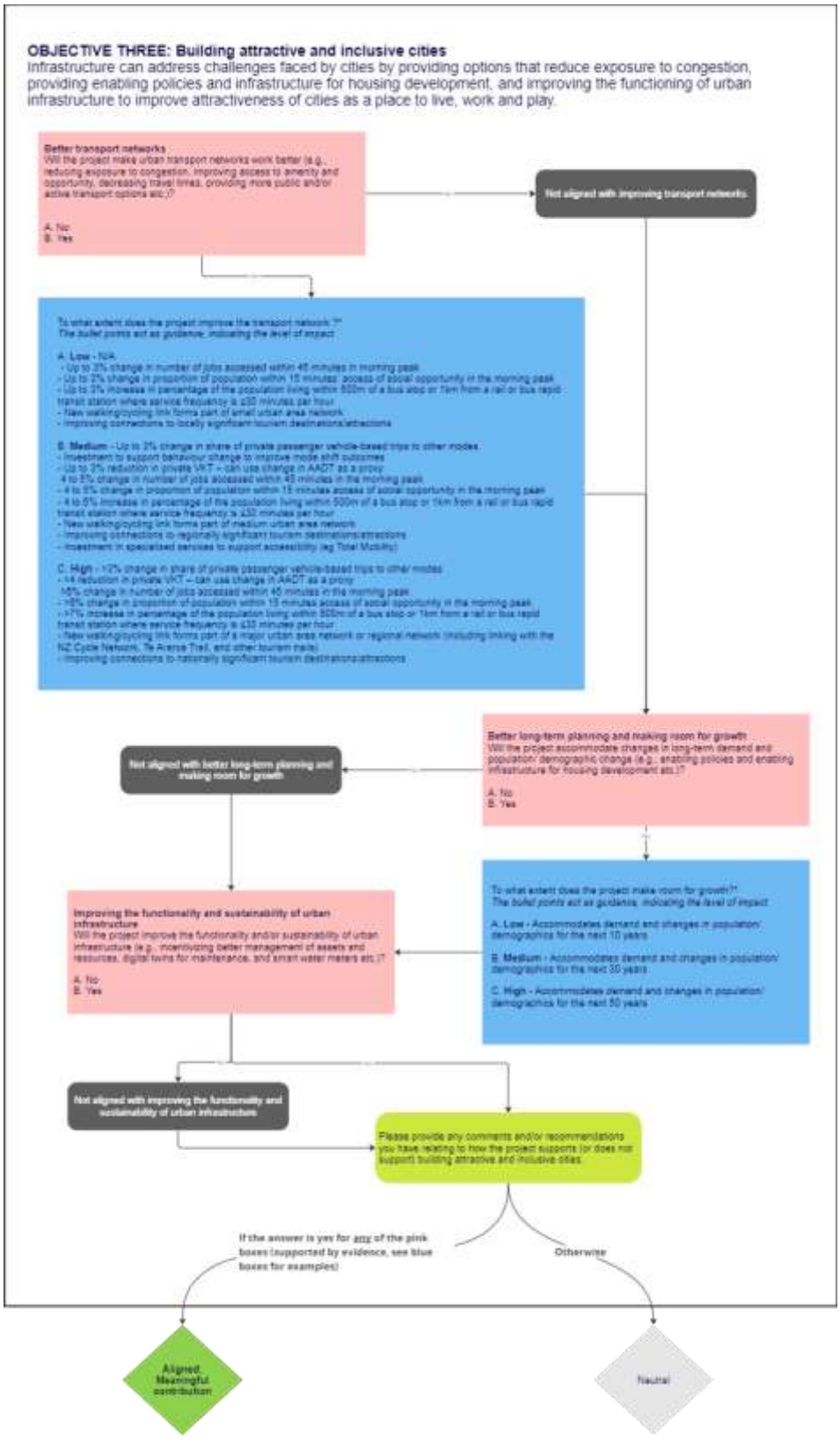
Objective One: Enabling a net-zero emissions Aotearoa



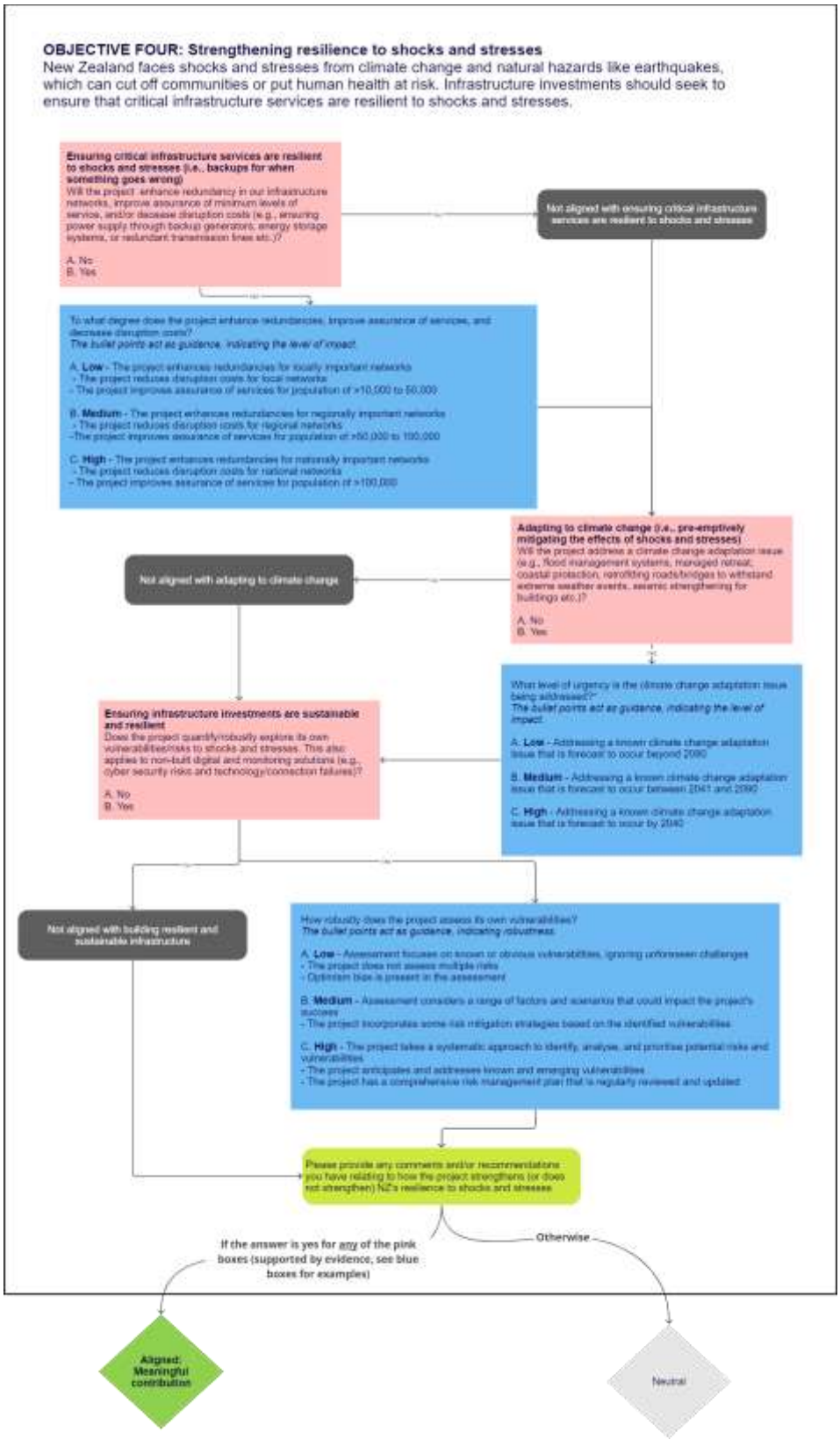
Objective Two: Supporting towns and regions to flourish



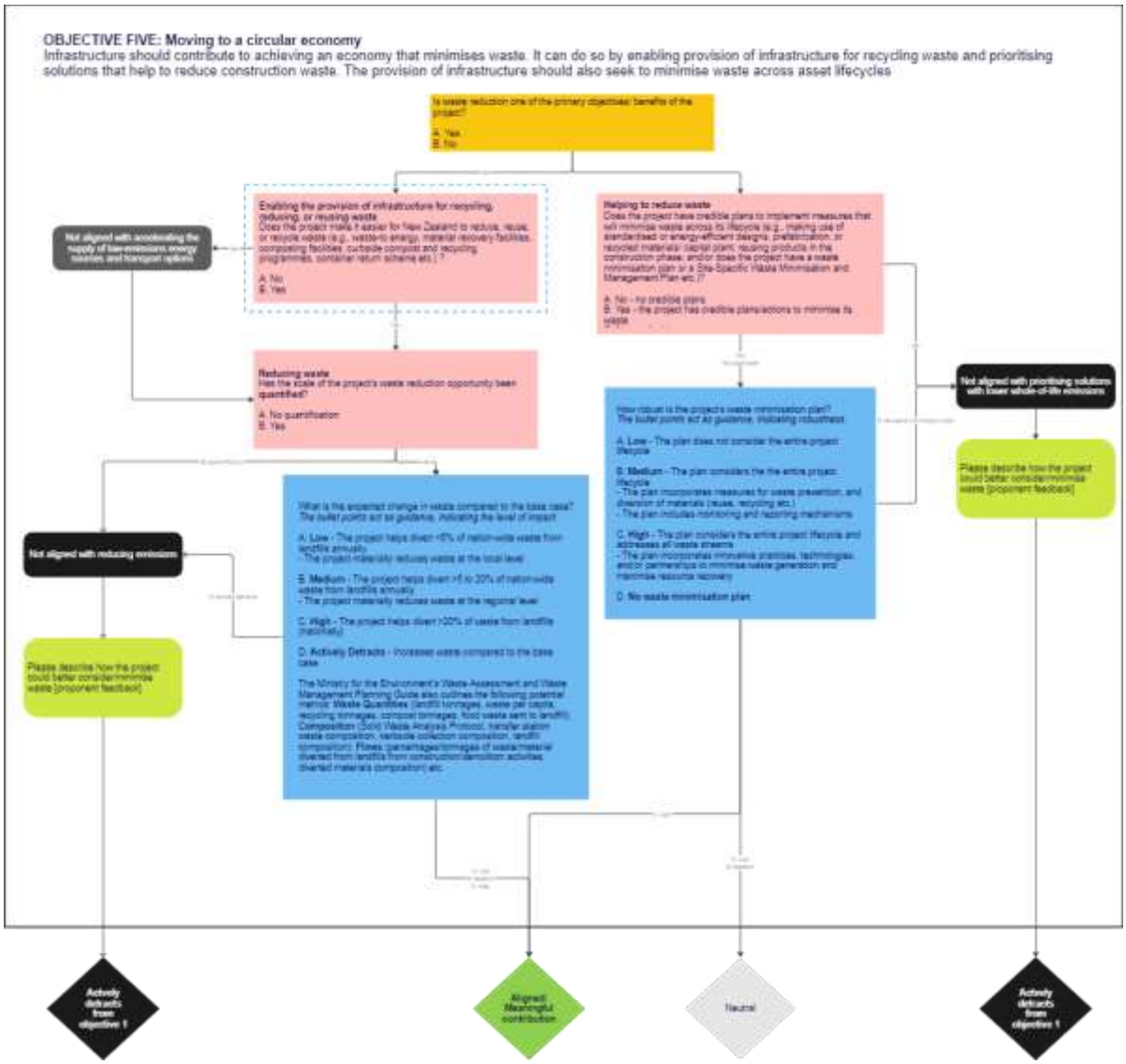
Objective Three: Building attractive and inclusive cities



Objective Four: Strengthening resilience to shocks and stresses



Objective Five: Moving to a circular economy



Appendix D: Assessment methodologies and tools for value for money, risk, and uncertainty

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
Value for Money				
Cost Benefit Analysis (CBA)	**Selecting the preferred option** A CBA systematically measures the effects of a project over its lifetime, including the project's social, economic, and environmental impacts. It does this by quantifying the present value of a project's costs and benefits. The output of a CBA is a Benefit-Cost Ratio (BCR), with ratios over 1 indicating that the project is net beneficial to society. A CBA is generally used to help identify the preferred option. However, where costs/benefits are difficult to quantify or monetise, and/or where distributional impacts are an important consideration, a CBA may be one tool as a part of a more holistic approach to identifying a preferred option.	• Considers a wide range of monetary and non-monetary factors • Uses a structured framework that allows for relatively more transparency and objectivity • Most robust tool for economic appraisal • Flexible in its application to different types of intervention and across sectors	• Typically, the most time and cost intensive tool to determine value for money • Some costs and/or benefits can be difficult to quantify and/or monetise • Relies on simplifying assumptions that may not reflect reality • Does not consider equity • Can be complex, so requires either outside expertise or high levels of staff capability • May not be suitable for transformational projects	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Use in Stage 2:** Because CBA is relatively time and cost intensive, it is an inefficient tool for (1) filtering options from the longlist, or (2) for identifying the shortlist. However, CBA should be used to inform/select the preferred option as CBA provides the most objectivity and rigour to justify and support a decision. Because decisions on funding often occur at the IBC stage, emphasising the need for detailed CBA at Stage 2 is appropriate to ensure that there are at least some options that deliver value for money (particularly for large, high-cost projects). **Use in Stage 3:** For an DBC or a SSBC, detailed CBA is the most appropriate tool for assessing value for money.
Rapid Cost Benefit Analysis (Rapid CBA)	**Identifying the shortlist** A Rapid CBA applies standard CBA principles and techniques to compare options using the present value of benefit and costs. However, a Rapid CBA differs from a CBA as it: • focuses on quantifying only the most material economic costs and benefits • has a lower level of precision about design, costs, and benefits • makes more simplifying assumptions A Rapid CBA is useful for filtering out inefficient options from the longlist and/or for identifying the shortlist. It does this by applying quantitative economic analysis without the time and cost of a detailed CBA. However, it is not a robust tool to select the preferred option.	• Reduced cost and time compared to a CBA, as it only focuses on the most material costs and benefits (including through established models) and has a lower level of precision/accuracy • Increased objectivity and rigour compared to other tools such as MCA • Rapid CBA is flexible across intervention type and sector • Analyses options using a common measure, allowing comparison between options	• Less rigour and objectivity compared to a CBA. A rapid CBA may not capture the complexity and nuances of a project and may overlook important factors that could have a substantial impact on the overall assessment • Rapid CBA relies on more simplifying assumptions and generalisations compared to a CBA. As such, there is a higher risk that the assumptions do not accurately reflect reality	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Use in Stage 2:** A Rapid CBA balances quantitative analysis with efficiency and is an appropriate tool for the IBC. If rapid CBA provides a high level of certainty that an option will be more costly and achieve lower benefits than another option, then this is generally sufficient to remove the option from further analysis. **Stage 3:** Rapid CBA is generally not recommended for detailed analysis of the shortlisted options or for selecting the preferred option.
Cost Effectiveness Analysis (CEA)	**Analysing options given a specified and identical outcome** A CEA is a partial cost-benefit approach that compares the relative costs of options against specific outcomes that have been agreed upon (e.g., reducing the road toll). CEA is generally appropriate when project options deliver a single benefit or when all benefit categories scale in line with a single outcome or output. For instance, the benefits of providing school infrastructure will tend to scale in line with the number of students served. A CEA shows the results in terms of the average cost per unit of outcome (e.g., the average cost per life saved). As such, a CEA	• The CEA allows for direct comparison of different interventions in terms of their effectiveness in achieving a specific goal • Can be designed to accommodate multiple outcome measures. For example, by using a Cost-Effectiveness Plane which graphs the incremental effectiveness of an option-effect bundle (relative to the status quo) against its incremental cost. This allows for the consideration of	• CEA has a relatively narrow perspective (focused on one or a few specified outcomes) and may overlook important costs and benefits • Relatively less flexible across project type compared to other economic appraisal methods • Cannot be used to find or compare projects that could achieve greater net benefits by targeting *different* outcomes	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Stage 2 and Stage 3:** For the vast majority of business cases for infrastructure projects, where both costs and benefits differ between options, CBA is the appropriate appraisal tool to use. **Use in limited cases for Stage 2 and Stage 3:** In cases where project benefits/outcomes are: (1) similar across options AND (2) are related to the overall objectives of the proposal

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
	identifies the least-cost, and therefore the most cost-effective option. In other words, CEA is concerned with maximising agreed outcomes within a given cost constraint. CEA is useful for ranking options that deliver similar outcomes when it is difficult to monetise the outcomes.	multiple outcomes and depicts potential trade-offs • Helps decisions-makers allocate resources efficiently, particularly when budgets are constrained	• Limited guidance in New Zealand	A CEA may be appropriate to use for the IBC and DBC. This is particularly the case where there is a strong policy objective for a certain level of service to be delivered. For example, improving digital connectivity in rural areas or reducing the road toll.
Economic Impact Analysis (EIA)	**Assess the economic impacts of a project** EIA estimates the effect that a project will have on the structure of the economy, or on the economic welfare of groups of people. Economic impacts are usually expressed in terms of number of jobs, income effects, tax revenue, and good/service output etc, broken down by sector and/or location.	• Better understand which sectors and/or locations stand to gain or lose from the project. For example, a new project or program might create economic opportunities in one region, but could also increase the scarcity of inputs, and in turn affect output in other sectors • Useful for quantifying monetisable economic benefits of a project	• Narrow focus, does not capture the full range of project impacts, and relies on simplifying assumptions that may not reflect reality • Common approaches like multiplier analysis tend to significantly overstate the net benefits of options by neglecting crowding out/displacement effects • Limited guidance in New Zealand	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Can be used in Stage 2 and Stage 3 to support a more holistic analysis:** EIA alone does not measure the efficiency effects of a project (i.e., value/outcome for money). As such, it should not be used as a key or standalone tool for option engineering or for option selection. However, it can be used alongside an appropriate tool (e.g., CBA in Stage 2 or 3) to support a more holistic analysis by estimating the economic impacts of a project.
Multi-Criteria Analysis (MCA)	**Reducing a longlist of options to a smaller, filtered list of options for more detailed quantitative assessment** MCA is an analysis process that can use qualitative and/or quantitative evidence to score and rate options against multiple criteria that are linked to the objectives of an investment. MCA is useful for reducing an initial long-list of options that align with strategic objectives to a smaller, filtered list of options for more detailed assessment. The output of an MCA is a filtered list of more promising options. MCA is also useful for comparing options where a project's impacts cannot be easily monetised or quantified. In these instances, MCA can be used as a complementary tool alongside more robust methodologies that outline the monetised costs and benefits (i.e., CBA). Detailed MCA guidance can help improve the consistency of its application across projects.	• Cost-effective for reducing a large number of options to a more manageable option set for further, more detailed analysis • MCA is a comparatively flexible tool that can accommodate both qualitative and quantitative evidence. MCA can also be applied across different types of intervention and across sectors • MCA can assess options on a like-for-like structured quantitative basis (consistent metrics and criteria) • If well documented, MCA is transparent and relatively accessible to the general public due to its less technical nature	• Potentially misleading level of rigour and accuracy • Subjectivity and potential bias in criteria design and weightings • Difficult to compare options where the same criteria do not apply across all of the options • Cost can be a weighted criteria. But anything less than a 50% weighting would lead to perverse outcomes (e.g., a 10% weighting means that decision-makers would accept a doubling of cost in exchange for a 10% increase in perceived benefits) • Relatively higher risk of double counting benefits	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Use in Stage 1 and 2:** The key role of the MCA is to reduce a very long list of options to a more reasonable number that can be analysed further using Rapid CBA and/or CBA. **Can be used in Stage 3 to support a detailed CBA**: MCA should not be used as a key or standalone tool for prioritising options beyond the long-list stage. However, MCA can be used to support a more holistic and robust analysis (e.g., CBA in Stage 3) by analysing non-quantifiable or non-monetisable benefits. Where benefits can be monetised, CBA is the appropriate tool for assessment. To mitigate the weaknesses/limitations of an MCA, assessors could re-weight criteria so that cost always have a 50% weighting (in CBA, costs implicitly receive a 50% rating through the BCR calculation).
Distributional analysis	**Identify who wins and who loses** Distributional analysis highlights how costs and benefits are distributed over different cohorts of a population. Distributional analysis involves identifying key groups that stand to win or lose, then allocating qualitative and quantitative costs and benefits to one or more of these groups. Once distribution is better understood, the project team can 1) consider whether any of the costs/benefits can be shifted to another group and/or 2) address any inequities through project design or other out-of-project interventions. Not all projects need to be distributionally neutral,	• Identifies any equity/disparity concerns related to a project • Could be useful to allocate costs for beneficiary pays • Supports advocacy for minority or marginalised groups and holds decision-makers accountable • When used in conjunction with CBA, decision makers can select efficient	• Emphasis on addressing equity on a project-level when more efficient options may exist at the system-level • Qualitative assessment risks overstating benefits to minority groups and understating benefits to others • Subjectivity in defining equity. Distributional analysis alone may not capture the full complexity of equity	**Stage 1:** Articulate key groups that stand to win, particularly if one of the key outcomes of the project is to increase equity **Can be used in Stage 2 and Stage 3 to support a more robust analysis**: Distributional analysis should be used when an intervention is likely to have a significant impact on different groups. Distributional analysis alone does not measure the efficiency effects of a project (i.e., value/outcome for money). However, it can be used to support a more holistic and robust analysis by identifying how different groups are affected by a project

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
	however, this is a useful tool for identifying when addressing inequities may be appropriate. Project benefits are often not uniformly distributed across the population. Other methodologies such as CBA do not explicitly take distribution into account, as value for money assessments are generally conducted from the perspective of society as a whole (i.e., CBA is agnostic about who benefits, and it is assumed that $1 has a constant marginal value for all individuals).	and equitable projects (or work to mitigate the effects of any induced inequities) • Outputs of analysis are typically easy to understand and interpret. Graphs, maps, and other visualisations are commonly used to display the distribution of variables across groups	considerations. Different stakeholders may have different definitions and priorities regarding what constitutes equitable outcomes, making it challenging to reach a consensus based solely on distributional analysis.	(e.g., by ethnicity, location, age, gender, disability, income, wealth, immigration status etc). Distributional analysis can be used alongside value for money analysis to: • consider whether any of the costs/benefits can be shifted to another group (e.g., shift costs to those who benefit), and/or • address any inequities through project design or other out-of-project interventions
Non-monetised costs and benefits	**Where impacts cannot be robustly expressed in monetary units, or it is difficult to do so** Costs and benefits should be monetised, but this may not always be possible or practical. In such cases, quantitative and/or qualitative evidence can be useful to provide important context and information to decision-makers. Impacts that may be difficult to monetise include cultural impacts, equity and distributional impacts, Māori values, value of open space, and mental health impacts etc. If impacts cannot be monetised, then quantification of impacts is the next best option. Where impacts cannot be quantified, then qualitative evidence or "narrative analysis" is still useful.	• Increases contextual and holistic understanding of less tangible factors such as mental health, local history and needs, and cultural and indigenous values • More inclusive decision making through capturing the perspectives and values of stakeholders who prioritise non-monetary factors • Narratives are easier to understand by the general public compared to technical analysis	• Subjectivity in qualitative judgements and higher risks of bias • Lack of standardisation. Without a common metric, it is more difficult to prioritise and make trade-offs between different options • Non-monetised analysis makes it difficult to compare the relative magnitudes of costs and benefits	**Stage 1:** Articulate the problems and opportunities being addressed as well as the intended outcomes **Can be used in Stage 2 and Stage 3 to support a more robust analysis**: Non-monetised costs and benefits should be reported when project impacts cannot be expressed in monetary units. This analysis is useful for: • Resolving "line calls" where two options have similar monetised BCRs, • asking structured questions about how large non-monetised benefits would have to be to select an option with a relatively lower monetised BCR Non-monetised costs and benefits is not a robust tool for decision making but can be used to support a more holistic and robust analysis. Non-monetised impacts may provide important information for decision-makers to fully understand the impacts of the option being considered.
Uncertainty analysis for project options that incorporate flexibility				
Scenario analysis (uncertainty)	**Assess project outcomes under a range of possible futures to better understand and manage uncertainty** Scenario analysis is based on the premise that investing in infrastructure is complex and that the future is uncertain. As such, it is important to understand and strategically plan for how projects will perform under different futures. Scenarios can be modelled in detail or assessed qualitatively. Scenario analysis is useful for identifying plausible future states (e.g., high-population growth, environmental change, policy, or regulatory changes etc) and finding a solution/option that is robust across different futures. Dynamic Adaptive Policy Pathways (a broader decision-making approach that emphasises long-term-planning and adaptation in the face of uncertainty) also incorporates Scenario analysis.	• Helps decisionmakers anticipate and prepare for different future opportunities and challenges, enabling more strategic planning • The analysis maintains relevance by accommodating changing assumptions, inputs, and trends as new information becomes available • Considers multiple factors, uncertainties, and interdependencies	• Limited predictive power • Scenario Analysis lacks standardisation of methodologies and frameworks • There is limited guidance in New Zealand (mostly focused on climate change)	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** Identify scenarios that cannot be managed through risk analysis and would impact options analysis (e.g., high population growth). Develop and apply these scenarios to test the expected impact of uncertainty on the value for money analysis and/or commercial analysis. In most cases, a scenario analysis would include 3-4 coherent and evidence-based futures. The set of scenarios should include optimistic, pessimistic, and more or less probable developments, based on the identified uncertainties. **Use in Stage 3:** Further refine and apply Scenario Analysis.

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
Real Options Analysis (uncertainty)	**Embeds flexibility into an investment strategy to better structure and manage projects impacted by uncertainty** Similar to Scenario analysis, Real Options Analysis seeks to understand the value of investments under different future states. However, it differs from Scenario analysis as it: • Focuses on flexibility and dynamic investment strategies (i.e., the real option alternative incurs additional costs or forgoes benefits in exchange for flexibility to adapt in the future) • Is typically more quantitative in nature (with varying levels of technical complexity between real options analysis) Real Options analysis is useful when there is significant uncertainty in proposal assumptions or future states.	• Identifies and quantifies the value of flexibility in investment and gives the delivery agency the opportunity to adjust strategies and decisions based on evolving market conditions, regulatory changes, or technological advances • Enables a better understanding and management of risks by considering the value of deferring, expanding, or abandoning projects	• More cost and time intensive than Scenario Analysis • Gathering high-quality historical data may be challenging, particularly for novel and/or very large projects • Difficult to communicate results and insights to the public and some stakeholders • There is limited guidance in New Zealand	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Consider in Stage 2:** Consider whether Real Options Analysis would have any impact on the shortlisting of options. **Use in Stage 3:** If Scenario Analysis highlights that uncertainties or future states have a significant impact on investment outcomes, then proponents may want to apply Real Options Analysis in the DBC to inform the preferred option.
Risk analysis for fixed project options				
Qualitative risk assessment	**Use to identify, estimate, and mitigate risks when there is a clear enough future** Qualitative risk assessment involves: 1) identifying the full range of project risks; 2) estimating their likelihood of occurrence and expected impact on the project; 3) developing mitigations to key risks; and 4) reassessing risks after mitigations have been applied. Qualitative risk assessment is a useful tool for all proposals. Qualitative risk assessment can include quantitative and qualitative analysis, as well as inputs from specialists and/or stakeholders.	• Relatively simple to understand and apply • Rapidly identifies relevant risks, so is time and cost effective • Helps raise early awareness of potential risks and encourages proactive risk management by initiating discussions on risk mitigation actions	• Subjectivity, particularly around providing risk impact ratings and likelihood of occurrence ratings • Lack of precision and comparability between risks, which makes it difficult to prioritise risk management efforts • May not capture all key risks, or may not capture the complexity of identified risks	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** Develop a list of all relevant risks while identifying/ analysing options. Then, identify the highest rated risks for further analysis. Risks are typically rated using likelihood of occurrence and impact. **Use in Stage 3:** Validate qualitative risk assessment for the shortlist of options. Then , develop a detailed risk register (including mitigations) for the preferred option.
Quantitative risk analysis: • Sensitivity analysis	**Determine the potential impacts of risks on project outcomes by varying key inputs and assumptions** Sensitivity analysis is used to test how the costs and benefits of each option change if there is a change in a particular input or assumption, set of inputs and assumptions, or set of assumed changes in the outcomes (e.g., costs increase by 20%, or assume benefits are 20% lower). The detail of this analysis can vary from a simple "what-if" test to more complex modelling. Sensitivity analysis and Scenario analysis can look identical in practice (e.g., assume different levels of land-use). However, the purpose of these analyses are fundamentally different. • Sensitivity analysis aims to determine the potential impacts of **risks** on project outcomes by varying inputs and assumptions to see how much they change expected outcomes. This also highlights which inputs have the largest impact on outputs. • Scenario analysis helps to ensure that preferred options are robust to different futures and **uncertainty** by testing how robust options are against several alternative scenarios, rather than developing one assumed future.	• Helps decisionmakers understand the key factors and variables that impact project outcomes • Can enhance the robustness of CBA if it is incorporated • Sensitivity analysis can also highlight the limitations of CBA and identify project vulnerabilities	• Limited precision, particularly for "what-if scenarios" • If a scenario analysis only examines one input variable at a time, it risks missing important interactions and dependencies between variables	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Use in Stage 2:** In the IBC, proponents should be cognisant of key sensitivities of the shortlisted options (e.g., land use settings). **Use in Stage 3:** DBCs should explore project-specific sensitivities and "general" sensitivities (e.g., discount rates, under/overestimation of costs and benefits, Best- and Worst-Case Scenarios, and deferral tests etc). Common sensitivity tests applied at the Business Case stage include: • Discount rate: +/- 3% around Treasury's recommended discount rate • Capital costs: +/- 20% around central estimate • Maintenance and operation costs: +/- 20% around central estimate • Benefits: +/- 20% around central estimate

Assessment methodologies	Description	Benefits/ Strengths	Costs/ Weaknesses	Appropriate Stage
Quantitative risk analysis: • Probability-based analysis	**Present costs and benefits in probability distributions** Probability-based analysis uses probability distributions to represent risky variables of interest, then uses computer simulations (often a Monte Carlo simulation) to produce probability distributions for key proposal outputs such as cost estimates, benefits, and BCRs. For example, a P90 cost means that there is a 90% likelihood that the cost will be equal or lower than the P90 cost.	• More confidence in outputs and prioritisation of risk management, as probabilistic analysis applies statistical observations on the outcomes of risks and is typically more comprehensive • May avoid the inclusion of large and generic contingencies, depending on the level of design	• Underpinned by subjective decisions/ assumptions, which may introduce sources of bias into the analysis • Gathering high-quality historical data may be challenging • Analysis can be time consuming, and results may be difficult to communicate	**Stage 1:** Proponents should outline the current context and environment that they are operating in, including how they intend to respond to changes and risks. **Stage 2 and Stage 3:** Probabilistic cost estimates (based on risk analysis for the proposal) are useful in the IBC and DBC as they can provide a more realistic picture of the costs compared to a "most likely" or cost point estimate. **Stage 3:** Probabilistic CBA can be useful for high-risk and large-scale projects where significant variances in cost and benefit estimates are expected.

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Appendix E: Sample projects

Name	Description	Info	Stage	Sector	Location	Funding	Costs	Benefits	BCR
Ara Tūhono – Pūhoi to Wellsford: Stage II - Warkworth to Wellsford	The business case is to preserve the corridor for a new offline transport corridor to complement State Highway 1. Part of a broader program.	DBC	3	Transport	Pūhoi to Wellsford	RLTP & NLTP	$91m route protection $1.7-$2.1b for construction	$1.25b Present Value	1.1 (with and without WEBs)
Congestion charging Auckland	*Te Waihanga has identified the potential benefits of introducing congestion charging in Auckland. This has also been under ongoing consideration by different political parties and parts of government.*	*N/A*	*Treated as Stage 1*	*Transport*	*Auckland*	*Central*	*Not yet known*	*No CBA*	*No CBA*
Wellington to Hutt Valley cycle and pedestrian link	Supplying improved cycling and pedestrian facilities between Wellington and the Hutt Valley. The project aims to support greater travel choice, increase corridor resilience, and improve safety and connectivity for cyclists.	DBC	3	Transport	Wellington	Central & Local	$42.2m (Present Value Whole-of-life-cost)	$105m (Present Value Whole-of-life-cost)	2.5
New Plymouth Water Conservation Plan	New Plymouth District Council's water conservation plan to achieve different reduction levels of gross per capita water consumption	Outline BC	2	Water	New Plymouth	Local	~$20m	No CBA	No CBA
Thames-Coromandel Kopu Marine Precinct	Strengthening the marine servicing industry to support the established aquaculture industry within the district, which will stimulate economic activity.	DBC	3	Aquaculture (Productivity Plan)	Thames-Coromandel	Central	$9.4m (capital costs)	No CBA	N/A
New Zealand Battery Project	Business case to address the risk of a 'dry year' while moving towards 100% renewable energy generation	Indicative BC	2	Energy	National	User/Crown/ private	~$14-16b nominal	Redacted	0.42
Tauranga multi-use boutique stadium	Create a multi-use stadium that: 1) meets the event, business, sports, and cultural needs of a growing Tauranga and Western Bay of Plenty; 2) has a positive economic and social impact on Tauranga and the sub-region.	Prelim BC	2	Community facilities	Tauranga	Central & Local & Private	$1.16b (Present Value Whole-of-life-cost)	$1.09b (Present Value Whole-of-life-cost)	0.94
Scott Base redevelopment	Implementation case for redeveloping the Scott Base, which is New Zealand's presence in Antarctica.	Implement. BC	3	Research	Antarctica	Crown	$344m	No CBA	No CBA
New Dunedin Hospital	Delivering two new hospital buildings on a new site.	DBC	3	Health	Dunedin	Central	>$1.7b	Redacted	Redacted
Mangere Precinct	The business case considers large scale land development in Auckland to address growing housing demand and shortages	Programme BC	3	Housing	Auckland	Crown	$1.54b	$3.65b	2.0
Defence Estate Regeneration	The business case is the framework for the regeneration, management, and use of the entire Defence Estate to 2035.	Portfolio BC	3	Defence	National	Crown	$5.88b	No CBA	No CBA
Christchurch Schools Rebuild	In response to the 2011 Christchurch Earthquake, the Government established a programme to rebuild and repair 115 schools that were affected.	N/A	Treated as Stage 1	Education	Christchurch	Central	>$1.6b	N/A	N/A

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