

Taking care of tomorrow today

Asset Management State of Play

November 2024

Foreword

Kurt Vonnegut famously said that a flaw in the human character is that everybody wants to build and nobody wants to do maintenance. We are seemingly predisposed to the new and shiny. But increasingly, our future livelihood depends on the less glamorous work of improving our existing infrastructure. Indeed, most of the infrastructure we will need over the next 30 years is already around us. That's been made possible by the \$287 billion of infrastructure inherited from past generations, with some 90% of this built over the past 70 years. What comes next is a significant renewal cycle to keep it all working.

This report examines whether we are up to the task. It paints a confronting picture – pointing to consistently low levels of asset management maturity across nearly all of New Zealand's public infrastructure. Half of our hospital estate is over 40 years old and is in poor condition; the quality of our subsurface assets is oftentimes unknown: out of sight, out of mind.

The incentives to maintain and renew existing assets are not always self-reinforcing. Renewals are commonly deferred in favour of lower rates or new capital projects. Equally challenging, many fees and charges that might otherwise fund maintenance activities have not kept pace with rising costs, leaving a funding gap for asset owners. As the years tick on, the problem has been allowed to compound. For local government for instance, some 52% of all capital expenditure by 2026 will be on renewals.

We are now confronted with a series of difficult trade-offs. Do we prefer lower rates, taxes and user charges but accept falling levels of service? Are we prepared to defer new capital projects in favour of looking after what we already have? Or are we prepared to pay more to get it all? The answer will surely differ across sectors and institutions, but one thing is for sure: the cost of poor asset management is high. If we stop painting the house, at some point the weatherboards will need replacing.

New Zealand has pockets of excellence and best practice to look toward. These pockets of excellence reveal common characteristics: passionate, high-performing asset management teams; representation around the executive table; and funding that is prioritised, or even ringfenced.

We hope this report will draw greater attention to the assets we already have. I encourage asset owners to read and digest this report, provide us with your feedback; to start a conversation with stakeholders about their expectations, acceptable trade-offs and willingness to pay; and take action to improve your organisation's asset management practices. If we get it right, we will be proud to hand the next generation of New Zealanders high quality assets that continue to be the bedrock of our economic, environmental and social connectedness.

Geoff Cooper

Chief Executive, New Zealand Infrastructure Commission, Te Waihanga

Disclaimer

The assessments in this report are based on the writers' knowledge of the sectors and publicly available information, supported by some interviews. This study did not attempt to undertake organisational asset management maturity assessments where they did not exist. We drew from existing documented and publicly available information available at the time the report was drafted (late 2023) (e.g., information disclosed under regulation, published asset management plans, or annual reports), additional information that organisations were willing to share (e.g., their own maturity assessments), and interviews with sector representatives. There are limitations to the report given the breadth of the sectors and the lack of publicly available information. The assessments of asset management maturity were undertaken in late 2022 and early 2023, and do not reflect any changes since then. More detail on the assessment methodology is in section 3.4.

Additional Notes

This report reflects the structures of the sectors as at the end of 2023. Subsequent structural changes, for example the disestablishment of Te Pūkenga and the Māori Health Authority, as well as recent changes to government policy, for example the discontinuation of the Three Waters reform, may not be reflected. Any structural changes are not expected to have a material impact on the underlying levels of asset management.

Not all infrastructure has been covered in this report. The sectors included are based on their relevance and importance for New Zealanders. We expect the findings are representative of other infrastructure not included in the scope of this report.

This report is limited to the management of *infrastructure* assets only. Accordingly, the recommendations made in this report are targeted towards infrastructure asset management, but we note that many of the recommendations would also be applicable to non-infrastructure assets such as Information Communications Technology (ICT) and specialised equipment.

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This report reflects the position of Te Waihanga in consideration of the opinions and findings of the independent consultants. The recommendations in this report have been revised from the independent consultants' initial recommendations, to reflect the views and experience of Te Waihanga.

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1. Summary

1.1 Why are we doing this?

The New Zealand Infrastructure Commission, Te Waihanganga states in Rautaki Hanganga o Aotearoa (the New Zealand Infrastructure Strategy) that over the next 30 years New Zealand's infrastructure must address many challenges including responding to changes in population and its distribution, to climate change and transitioning to a zero-carbon economy and many others. However, the biggest single challenge we face in the infrastructure sector may be the cost of repairing or replacing infrastructure that's wearing out.

99% of the infrastructure we need in 30 years is already in existence (NZ Infrastructure Strategy).

We have a duty to look after this legacy and squeeze the most value out of this infrastructure for future New Zealanders. Further, managing the need for, or not requiring new infrastructure, is a key strategy in reducing capital-related carbon consumption.

We have known for decades that most post-war horizontal and vertical infrastructure is close to end of life, and we are now seeing increasing evidence of asset failures. In 2023, media were reporting asset failures daily, including sinkholes in Auckland, water quality issues in Queenstown, persistent water leaks in Wellington and service outages with commuter rail and ferry services. These failures impact on our daily lives and shake the confidence of New Zealanders and our international reputation. New Zealand's social infrastructure is weak and impacting on the wellbeing of New Zealanders through insufficient capacity and poor condition hospital and mental health facilities, lack of aged care facilities and social housing.

There is generally a poor understanding of what asset management encompasses in New Zealand by citizens and some decision makers.

Asset management is ensuring the right assets, are in the right place, at the right time, managed by the right people.

The systemic nature of currently reported asset failures is caused by a lack of appropriate asset management practice and/or lack of investment in renewing or replacing infrastructure. So, there are plenty of reasons to manage New Zealand's infrastructure assets well, and yet:

there is little readily available information to inform us of how well we are doing in asset management, and just as importantly, whether our assets meet current and future needs.

If we needed more reasons for focusing attention on infrastructure management, they occurred in the weather events of early 2023. System interdependences caused cascading failures: electricity failure caused wastewater overflows, and telecommunications outages caused subsequent disruption to other services such as electronic financial payments. Response and recovery efforts were hindered by restricted road access to fix sites, including leaving some communities isolated for extended periods. Reacting to events is more costly and less effective than providing more resilient critical infrastructure. The World Bank has recently identified that:

investment in resilience delivers benefits in 96% of scenarios, and the median scenario benefit is a four to one benefit/cost payoff¹; climate change on average “doubles” the benefit/cost ratio to 8:1.

Yet we know New Zealand is stuck in a cycle of reacting to specific events when they occur – adaptation through recovery and not pro-active resilience planning and investment. Closer to home it is estimated that the \$2 million invested to increase the Taradale stop-banks in Napier may have averted \$2 billion in damage and almost certainly more lives in Cyclone Gabriel².

Use of the term critical infrastructure

This report uses the term critical infrastructure to describe infrastructure that is foundational or fundamental to how New Zealanders live their lives. The Department of Prime Minister and Cabinet is currently developing a legislative definition of critical infrastructure that will provide clarity on which infrastructure should be considered as critical.

¹ Hallegatte, Stéphane; Maruyama Rentschler, Jun Erik; Rozenberg, Julie.

Lifelines : The Resilient Infrastructure Opportunity (French). Sustainable Infrastructure Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/821871561014920854/Lifelines-The-Resilient-Infrastructure-Opportunity>, page 2-3

² Presentation from New Zealand Lifelines Forum in October 2023

1.2 What is infrastructure asset management?

Asset management came to global attention in the late 20th century as governments realised that while they were often good at building infrastructure, planning for the long-term delivery of services was woefully inadequate. Concerns about the growing burden of deferred maintenance and renewal was highlighted through critical asset failures, causing massive community and economic disruption. Improved asset management was seen as the panacea to solve these problems. For example, a hugely disruptive electricity outage to Auckland City in 1998 triggered stronger asset management regulation in this sector, and subsequently others.

So, what is asset management? The words conjure different meanings for many people, but essentially it refers to the people, practices and tools that are applied to generate value from assets. This value is created by managing assets to provide services to customers and communities, which enables them to live and work and contributes to their wellbeing (warm homes, safe water, good hospital services, etc).

The benefits of asset management are generally recognised as being stronger governance and accountability, alignment of service levels with customer and stakeholder needs, robust and evidence-based asset investment decisions, effective risk management, improved financial performance, improved operational efficiency and effectiveness, stakeholder assurance, and many others.

In the New Zealand context, we are thinking about what it means to be good stewards and applying the principles of *kaitiakitanga*, to managing our natural and infrastructure assets. Asset management is a useful framework to achieve more resilient infrastructure and support wider sustainability objectives as it provides the link between services, service levels and assets.

Good asset management practices enable decision-makers to make an informed trade-off between cost, risk, and the level of service provided through infrastructure assets.

1.3 What are we doing?

This report focuses on asset management of infrastructure in New Zealand. By infrastructure we mean the roads, bridges, water supply, wastewater, stormwater, buildings, ports, airports, telecommunications, social infrastructure, and other assets that support the well-being of New Zealanders.

This report is intended as a “first pass” to identify relative asset management maturity at a sector level and to identify recommendations to improve infrastructure asset management in New Zealand.

Asset: An asset is an item, thing or entity that has potential or actual value to an organisation.

Asset management: The coordinated activity of an organisation to realise value from assets (ISO 55000).

Objective of asset management: To meet a required level of service in the most cost-effective manner, through the management of assets for present and future customers (IIMM).

Levels of service: Levels of service are the means of defining the outcomes and outputs that customers can expect from asset-based activities, measured through achievement of defined performance measures and targets.

Infrastructure: A system of inter-connected physical structures that employ capital to provide shared services to enhance wellbeing (New Zealand Infrastructure Strategy).

Asset management benefits: Strong governance and accountability, effective lifecycle decision-making, enhanced customer service, improved risk management, financial sustainability.

We wanted to learn what’s working well, and where things are not working well, learning why this is and how they could be improved. This latter point is important – we wanted to identify whether and where action is needed to ensure that New Zealand’s infrastructure assets are being managed to an appropriate level of maturity, recognising the criticality of the infrastructure service being provided.

The study aims to understand how well New Zealand is managing its infrastructure, by assessing the level of advancement (maturity) of asset management practices across the infrastructure system. We have looked at the system and sector settings that influence asset management, as well as the organisational asset management maturity of infrastructure-owning organisations.



Figure 1-1: Scope of New Zealand’s asset management system

We have called the organisations covered in this report “major infrastructure providers”. Some recommendations in this report may not be appropriate or achievable for companies with a very small asset base and/or low criticality assets. The criteria for determining which organisations should be defined as “major infrastructure providers” involves judgement, however criteria may include the replacement cost of infrastructure assets, and the criticality of those assets. We note that the Infrastructure Strategy³ (under recommendation 25) and Action Plan identified that a principles-based definition of critical infrastructure should be developed and applied.

Potentially the definition of critical infrastructure could be used as the basis for requiring higher levels of maturity and more frequent maturity assessments.

1.4 Summary of results

This study assessed the maturity of asset management practices across the infrastructure sectors, using the framework in the *International Infrastructure Management Manual* (IIMM 2020).

A *mature* asset management organisation takes a long-term, optimised lifecycle approach to managing assets, has aligned corporate, asset management and operational objectives, has fit-for-purpose

³ [Recommendation | Increase the resilience of critical infrastructure \(tewaihanga.govt.nz\)](https://www.tewaihanga.govt.nz/recommendation/increase-the-resilience-of-critical-infrastructure/)

information systems and data, is sufficiently resourced and competent, and takes an evidence-based approach to capital and operational decisions.

Advanced asset management is not everyone’s goal. The appropriate level of maturity depends on how critical the assets are to service delivery, the value of the asset base, and other factors.

It is important to note that evidence to support asset management maturity was not readily available for most sectors, and we did not attempt to undertake organisational asset management maturity assessments where they did not exist. We drew from existing documented and publicly available information (e.g., information disclosed under regulation, published asset management plans, or annual reports), additional information that organisations were willing to share (e.g., their own maturity assessments), the writers’ own knowledge of practice, and interviews with sector representatives.

Figure 1-2 illustrates the results, with the sectors’ maturity results presented for 12 asset management functions (the maturity assessment process is included in section 2.6.3 and full scoring descriptors for each asset management function are included in appendix six). The colour shading below was applied to show the range of each sector but doesn’t necessarily indicate full achievement of that maturity level. The pluses and minuses reflect a score at the upper or lower half of the range, respectively.

Sector	Energy	Telcos	Water/Waste	Transport	Health	Community	Education	Other sectors
Strategic direction	+	-	-	-	-	-	+	-
Levels of service	-	-	-	+	+	-	-	+
Demand	+	-	-	+	+	-	-	+
Risk	+	+	-	-	-	-	-	+
Operational planning	-	+	-	-	-	-	-	-
Capital planning	-	+	-	-	-	-	-	-
Financial management	-	+	-	-	+	-	-	-
Asset management plans	+	-	-	+	-	+	-	-
Evidence	+	+	-	+	+	-	+	-
People	+	+	-	+	-	-	-	-
Service delivery	-	-	-	-	+	-	-	+
System and improvement	+	-	+	-	+	-	-	+
Overall	+	-	-	+	-	-	-	-

Figure 1-2 Asset management maturity across infrastructure sectors

Aware	At upper end of range, the organisation is aware of the need, but has not yet implemented, the process or practice
Basic	At upper end of range basic level processes and practices are in place
Core	At upper end of range well defined and clearly linked processes and practices are in place
Intermediate	At upper end of range well defined and clearly linked processes and practice are in place and well understood throughout the organisation
Advanced	At upper end of range integrated processes and practices use advanced techniques and are being continually improved to deliver optimum performance

Asset management maturity ratings by the 23 sub-sectors are included in appendix six and the function ratings by sub-sector are included in section four of this report.

1.5 Observations

Through the process of developing this report, the following observations were made about the infrastructure asset management system in New Zealand:

Overall, for a small country, the system for managing infrastructure assets is complex with a wide variety of infrastructure management models, governance, organisational structures, and service delivery.

As expected, asset management maturity is generally higher in the more critical infrastructure sectors - these being the energy, transport, and water sectors. The health sector is the exception, which has highly critical infrastructure but poor asset management and poor physical infrastructure that affects wellbeing and health outcomes.

Sectors such as health and justice have significant property assets, but service provision is their core focus and long-term asset management planning is not a core skill. For these organisations, as well as fewer requirements, there can be less understanding and focus on infrastructure at governance level, and this may contribute to some sectors having lower asset management maturity and lower quality assets.

High asset management maturity doesn't always equate to high quality service outcomes as there are other factors at play such as funding, governance decisions, workforce capacity and many more.

As one example, despite land transport showing at relatively high levels of maturity, we know that New Zealand's road's levels of service are less than desirable. State highways have managed funding shortfalls by focussing more on reactive maintenance which has led to more potholes in roads. This was not communicated to users who are now concerned that the road quality has deteriorated to the point where they have real concerns about road safety. This is both a funding and communication issue related to asset levels of service.

Asset management regulation and scrutiny has supported higher levels of maturity in some sectors, but not in others. Local government legislation requiring long-term planning occurred first in local government, but progress has been slow; and the three-year political cycle does not mesh well with trying to achieve stable, long-term asset management programmes and funding certainty. Asset management maturity is generally highest in the regulated energy and transport sectors: one reason is more effective and active regulators; another is having governance bodies (such as independent boards) that are highly aware of the criticality of the assets to service delivery and are focussed on managing risk and achieving regulated reliability and other standards.

Some sectors have very little asset management regulation, and low maturity: Central government asset management maturity is generally lower than other sectors and has more elements rated as "basic" and "aware". Long term plans (other than the National Land Transport Programme) are not required and while asset management plans were mandated in 2019, most government agencies do not have comprehensive asset management plans across asset portfolios in place. There is very little scrutiny and transparency on the capital side for central government agencies, with most reporting and performance processes focussed on operating appropriations. The Treasury Investor Confidence Rating (ICR) programme was in place from 2015 to 2021 to assess Departments and Crown Agencies with significant infrastructure, but was discontinued with the release of Cabinet Office Circular CO(23)9⁴ in September 2023. It is understood that the ICR was discontinued on the basis that it was delivering limited value in terms of incentivising meaningful behaviour change across the investment system, including asset management practices. CO(23)9 is intended to drive more robust practices and appropriate agency accountability, specifically there is a new requirement for Departmental and Crown Entity Chief Executives to "attest" to meeting the new requirements under CO(23)9. This will first occur in June 2024. Furthermore, the Office of the Auditor-General is meeting quarterly with Treasury in response to this change with the expectation that better practice is encouraged.

While the ICR may not have been wholly effective, most agencies identified a reduced focus on asset management in the period between the discontinuation of the ICR and the implementation of the new

⁴ [CO \(23\) 9: Investment Management and Asset Performance in Departments and Other Entities - 18 September 2023 - Cabinet Office \(dPMC.govt.nz\)](https://www.dPMC.govt.nz/circulars/CO(23)9)

CO(23)9 requirements, except for where specific Budget investment in asset management was received (for example Corrections and Ministry of Health). Earlier Cabinet Office Circulars on Investment Management (such as CO(10)2 and CO(15)5 have generally not been fully implemented by agencies with variable compliance methods, so this has been a long-running issue. Given the \$267 billion⁵ in property, plant, and equipment asset values in government accounts, the lack of asset management should be concerning to taxpayers and government service users.

The effectiveness of the CO(23)9 changes has yet to be determined. We recommend a full implementation process including scrutiny of whether CO(23)9 requirements are actually being met, and accountability or consequences at agency level if there are gaps in compliance. Our review identified that the more mature sectors such as electricity and roading have comprehensive requirements, information disclosure requirements, and scrutiny of asset management artefacts and processes.

However, there are pockets of asset management excellence in all sectors: Advanced asset performance modelling, supported by a good asset evidence base, is driving more robust long-term renewal forecasts for some organisations. There are some excellent examples of customer engagement on infrastructure service levels in the local government sector. Private sector competition drives good practices around understanding customers and demand requirements. A key feature of almost all these success stories is getting the right people together with a passion for infrastructure, including a champion at the Executive and/or Board level.

1.6 Key issues

There is limited awareness of the ‘what’ and ‘why’ of asset management in many sectors. Many people in the infrastructure sector think of asset management as a specific technical process e.g., developing capital projects, or asset maintenance, rather than a holistic, strategic process.

People are the biggest constraint in improving infrastructure asset management maturity in New Zealand. There are workforce shortages across the infrastructure sector, yet advanced asset management practices need higher levels of resourcing and capability to achieve the benefits of optimising asset lifecycle decisions. Leadership and governance of the asset management system is poor across most sectors. The ability of asset managers to educate and present evidence and trade-offs to decision-makers may be an issue as often asset management evidence or artefacts are not driving investment decisions.

There is little transparency of infrastructure and asset management performance and planning. Other than regulatory performance disclosures for some sectors, there was little readily available national information on infrastructure performance. Lack of user-friendly access to infrastructure performance information is a key gap identified. There is limited published, useful information on the long-term future intentions to fund infrastructure and any impacts on future asset service performance.

There is insufficient provision for renewal and maintenance of infrastructure. We are facing serious funding challenges in New Zealand, with the Te Waihangā report on New Zealand’s infrastructure challenge estimating that New Zealand has a known public infrastructure deficit in 2020 of \$104 billion⁶, with \$77 billion in central government and the remaining \$27 billion in local government. In some cases, asset management plans are showing the funding gaps, but there is no appetite or insufficient funding to achieve the investment identified in the asset management plan.

⁵ [fsgnz-2023-charts-data.xlsx \(live.com\)](#), Financial Statements Government of New Zealand as at 30 June 2023, table 14

⁶ [new-zealands-infrastructure-challenge-quantifying-the-gap.pdf \(tewaihangā.govt.nz\)](#), page 1

Demand planning and management generally needs much more focus. Many organisations incorrectly equate a Statistics NZ population forecast with a demand forecast. Understanding the complexity of demand and customer behaviour, producing demand forecast scenarios to reflect uncertainties in assumptions, and effectively using demand management strategies should be a key focus area.

Optimising operational programmes has a long way to go. Lifecycle optimisation practices are evolving, and business case approaches are widely adopted to enable the optimal solution to be selected considering lowest lifecycle costs. However, few organisations can quantify their optimal level of planned versus reactive maintenance. Predictive modelling tools are used in a few sectors to model the level of service and cost impacts of varying levels of planned maintenance and renewal investment, but even in these sectors, a better information base is needed for high quality decisions.

System and Improvement is one of the lowest scoring functions for all sectors. This indicates poor quality management of asset management processes generally, as well as poor practices surrounding maturity assessments and management of asset management improvement programmes. This is evidenced as lack of (or even decline) in asset management maturity progress for many sectors over the last ten years. Why? Often asset management improvement budgets are cut during budget reviews, and this may be an outcome of many of the other issues noted in this report.

1.7 How can we collectively build asset management maturity?

In developing this report, we identified four themes where there is potential for improvement in asset management, with an expectation that these would drive improvement in infrastructure management more generally. The themes are: governance, transparency, resilience, and productivity. Throughout the report the recommendations are categorised in-line with the themes.

The key recommendations below are what we have identified as the most “pressing” gaps or most significant areas to improve asset management. These are complemented by additional recommendations in the system setting and asset management elements, as well as by the sector-specific recommendations in appendix six.

The key recommendations have also been tested for relevance across the 23 sub-sectors reviewed (refer to section 2.21 for a list of sectors included). A summary of the relevance of key recommendations by sub-sector is included in section 5.3 of this report. In addition, a table on the relevance of key recommendations is included in each sector recommendations section by sub-sector in appendix six.

Theme one: Governance

Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.

A capable and resourced asset management system lead should provide oversight and alignment of asset management requirements and regulation across sectors, as well as verifying compliance with these requirements. This could be an existing agency or agencies, but the system lead would need to be sufficiently resourced with asset management capability and mandate. The system lead could support the Department of Internal Affairs (DIA) and Commerce Commission in their respective roles in asset management (the role of a system lead is described more fully in section 3.1.7).

We note that there is currently no “home” or organisation undertaking these activities. One of the key observations is that there is a failure across most infrastructure sectors to consistently invest in asset management improvement activities. There is currently a lack of accountability for the asset management improvement plans and no consequences for inaction outside of the regulated electricity sector.

Given the value of Crown property, plant and equipment at \$267 billion, and the lower asset management maturity identified across central government agencies in this report, focusing on central government and Crown entities in the first instance is required. A system lead could be established under the Public Service Act 2020 to provide leadership across government departments and Crown entities. More details on this recommendation are in section 3.1.7.

Key Recommendation 2: Require all public major infrastructure providers to have an identified and accountable governance body and/or executive lead for asset management. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

There is a lack of understanding of asset management at the governance level in many infrastructure providers in New Zealand. Asset managers are failing to convince decision-makers of the benefits of asset management, and in turn asset management governance and leadership is lacking in many organisations. There is a lack of leadership and sharing appropriate practice and expertise across central government and Crown entities where asset management practice is lowest.

Organisations should care about asset management and be responsible for stewardship of assets over the long-term, including adapting to climate change. We want someone to be accountable such as the Person Conducting a Business Unit (PCBU) under the Health and Safety at Work Act 2015. This could be a specific role/person or a governance committee e.g., some local government organisations now have a Chief Infrastructure/Asset Officer on the executive team.

Theme two: Transparency

A lack of transparency in asset management practices, infrastructure performance, and medium-to-long-term funding plans is a key finding of this report. We expect that more information, data, and plans for critical infrastructure should be publicly available. Some sectors such as electricity distribution are already required to publicly disclose evidence of asset management, however for central government and Crown entities there is a lack of information on asset management, asset performance, and asset renewal. There is limited information and data appropriate for “consumers” or “citizens” to understand their price, service, and risk trade-offs. Demand forecasting and response plans are generally an area for improvement in asset management plans.

Key Recommendation 3: Require all public major infrastructure providers to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

In some sectors there is limited oversight or scrutiny to ensure that there is appropriate asset management practice. Some organisations have undertaken asset management maturity assessments, but there is insufficient empirical evidence to determine a baseline. If asset management maturity assessments have been completed, they may not be disclosed or publicly available.

Transparency and oversight of asset management practice and infrastructure management as identified above should be the domain of system players and central agencies. There is limited asset management expertise in central agencies and no identified system lead for asset management, including limited effective incentives or enforcement of requirements.

We believe that maturity assessments lead to improvement in asset management practice, but acknowledge that independent verification may be an unreasonable requirement for smaller infrastructure providers with limited resources.

Key Recommendation 4: Require all public major infrastructure providers to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

We would like to see a consistent performance monitoring framework being applied across the infrastructure system, with outcomes such as safety, resilience and reliability underpinned by specific measures for each sector. Over time we would expect this requirement to drive good practice and improvement in underlying asset information.

We present examples in this report from Australia, such as the financial sustainability ratios in Australian local government and the Australian National State of the Assets Report⁷ and we can learn from the Australian experience. Financial sustainability measures could include the percentage of planned maintenance and the percentage of asset renewal of asset replacement values. This would provide more transparency that infrastructure providers are maintaining and renewing assets to optimise the useful life of assets.

Key Recommendation 5: Require all public major infrastructure providers to publicly disclose a minimum core level, 10-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

Asset management plans bring together the evidence to support long-term capital and operational asset requirements and demonstrate that organisations are good stewards of their assets. Some major infrastructure providers do not develop asset management plans, and others do not make their plans publicly available. Asset management plans should be aligned to internal and external budget processes and include funding strategies that identify any current and planned funding shortfalls (maintenance, renewal, demand, and service level changes), and how any shortfalls will be addressed. Asset management plans should demonstrate that the organisation has considered the range of alternatives to manage demand including both asset and non-asset solutions.

Again, the concept of appropriate maturity needs to be considered – all major infrastructure providers should have a minimum ‘core’ asset management plan with an ‘advanced’ asset management plan appropriate for the most critical infrastructure providers (further information is provided in section 5.4).

Theme three: Resilience

Despite demonstrable need through disaster events and major asset failures, investment in infrastructure resilience fails to get prioritised. Localised investment in core infrastructure is often insufficient to build the required level of resilience, and often central government is needed to fund the recovery.

Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other major infrastructure providers should be encouraged to meet this requirement.

There are no national standards or requirements for the resilience of critical infrastructure (apart from those in design codes and standards) and infrastructure providers are grappling with how to meaningfully engage with communities to discuss acceptable levels of risk and resilience.

⁷ [2021 National State of the Assets Report - Australian Local Government Association \(alga.com.au\)](https://www.alga.com.au)

New Zealand has a long history of underinvesting in resilience and overinvesting in recovery. Central Government has funded recovery costs after major events, further reducing the incentive for infrastructure service providers to invest in their own resilience.

Work is underway across government to improve risk reduction, resilience and recovery settings, and we are supportive of these reforms. We believe there could be benefit in efforts to prioritise investment in resilience, considering all appropriate funding avenues, to benefit all New Zealanders.

Theme four: Productivity

Asset management capability and capacity is limiting progress. There is no defined pathway into asset management to build the workforce, and many organisations don't recruit or retain sufficient expertise to establish and maintain an effective asset management system.

Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.

A key tenet of asset management is continuing improvement, but this element is the weakest, even across the more mature sectors. Sufficient resourcing to continue to develop and improve asset management practice has been lacking. Organisations such as Āpōpō, IPWEA, the Tertiary Education Commission, the Commerce Commission, the Electricity Engineers' Association, Gas Industry Corporation, the Office of the Auditor General (OAG) and Local Government New Zealand (LGNZ) provide guidance, good practice examples and training to the industry. Other countries such as Canada, have successfully funded national and localised training programmes to lift the level of competency of asset management staff.

Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.

Major infrastructure providers should co-ordinate planned responses to changes in demand. In the more fast-growing areas such as Queenstown and Auckland, there are numerous examples of developers being permitted to build new housing ahead of the infrastructure, leading to undercapacity assets and performance issues. While there are generally long-term infrastructure plans for councils (30-year time horizon) these may not be sufficiently integrated with networked infrastructure providers or central government services. Current land-use and planning settings may hamper effective spatial planning and delivery of services to communities⁸.

⁸ [Protecting land for infrastructure: How to make good decisions when we aren't certain about the future | Te Waihangā](#)

2. Infrastructure asset management in New Zealand

2.1 Context

The New Zealand Infrastructure Commission, Te Waihangā, is working to improve New Zealanders' lives through better infrastructure. It aims to lift the level at which infrastructure is planned and delivered, taking a strategic approach so that we maximise the social return on New Zealand's collective dollar and stand well prepared in the face of an uncertain future.

Our organisation's name, Te Waihangā, means a cornerstone, or to make, create, develop, build, construct, generate. Te Waihangā therefore reflects the significance of long-term planning in shaping New Zealand's future.

In 2022, Te Waihangā released a 30-year Infrastructure Strategy which sets out how we can make sure our investment in infrastructure delivers what we need, where we need it and at the right time. The strategy commits to doing this in a way that meets Te Tiriti o Waitangi obligations.

The Infrastructure Strategy was underpinned by a set of sector-based State of Play reports that describe the infrastructure we have today, why we have what we have, and how it's contributing to New Zealanders' wellbeing.

Te Waihangā has identified further State of Play reports to assist with progressing the objectives of the 30-year Strategy. This is the Asset Management State of Play - it presents our findings as to the status of infrastructure asset management in New Zealand. It includes a package of recommendations to improve infrastructure asset management to a level of maturity that is fit-for-purpose. Good asset management is an effective way to address the deficit identified in Rautaki Hanganga, because 99% of the infrastructure we need today is already in existence (New Zealand Infrastructure Strategy).

2.2 New Zealand's infrastructure

2.2.1 Defining infrastructure

The sector State of Plays are structured around the components of Te Waihangā's working definition of infrastructure, set out in our discussion document, "Infrastructure Under One Roof", and shows how they are related to one another in delivering services:

“A system of inter-connected physical structures that employ capital to provide shared services to enhance wellbeing.”

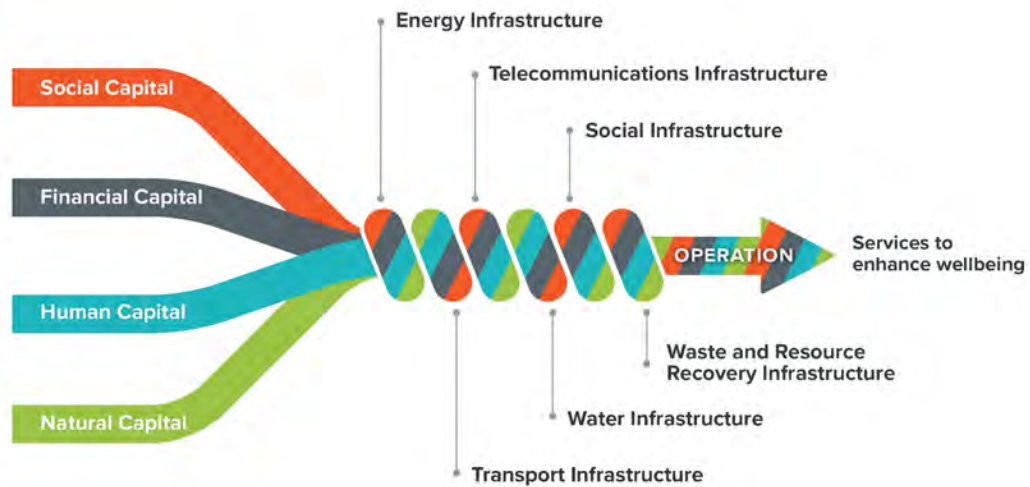


Figure 2-1: Connecting the four capitals, infrastructure sectors and wellbeing domains

By infrastructure we mean the assets that support the well-being of New Zealanders, within the key sectors (and sub-sectors in brackets):

- Energy (electricity, gas, liquid fuels)
- Telecommunications
- Water and waste (three waters, river control and flood protection, irrigation)
- Transport (local roads, state highways, rail, air, sea)
- Health (public, private)
- Community (social housing, community buildings, parks and open spaces)
- Education (primary and secondary, tertiary)
- Other sectors (defence, land and forestry, justice).

By asset we mean an item, thing or entity that has potential or actual value to an organisation (ISO 55000). Assets within the infrastructure sector include items such as roads, pipes and buildings.

By major infrastructure providers we mean the organisations that have overall accountability for the ownership and management of assets that deliver infrastructure services. The criteria for defining which organisations are major infrastructure providers is yet to be determined.

Delivery of infrastructure services may be directly related to the organisations’ objective such as New Zealand Transport Agency Waka Kotahi (NZTA) and Kāinga Ora – these are sometimes called asset-intensive sectors. Or infrastructure management may be a smaller part of the overall operating expenditure, but still important to the service delivery such as health (hospitals) and education services (schools).

2.2.2 An overview of New Zealand’s infrastructure sectors

Table 2-1 provides an overview of the sectors along with some key information, including:

- Asset importance to service function: reflecting whether services are predominantly provided by assets, or within assets.
- Existing asset management maturity assessments regulation: 'Yes' means that specific requirements for asset management plans and asset information disclosures are in place. 'Some' means there is regulation that is relevant to asset management practices, such as Major Hazard Facilities.

2.2.3 Strategic infrastructure challenges

The 30-year Infrastructure Strategy identified the following strategic infrastructure challenges. Improving infrastructure asset management maturity is seen as a key response to these challenges.

- **Ageing infrastructure:** Concerns about inadequate planning and funding set aside to renew these assets. Maintenance has been lacking which has accelerated deterioration in most cases.
- **Massive infrastructure deficit forecasts:** There has been insufficient infrastructure funding in general over the past 10-15 years particularly when population growth is considered. Asset management practices cannot make up for insufficient funding in the assets themselves, but mature asset management practices should clearly identify the service impact of lack of investment.
- **Infrastructure resilience to hazards and threats:** Infrastructure resilience has been a hot topic and government is reviewing the need for critical infrastructure reforms. Asset managers must consider risk assessment, mitigation strategies, and resilient design and construction practices.
- **Environmental, social, and governance sustainability:** Asset managers need to consider factors such as energy efficiency, waste management, and climate change adaptation and mitigation strategies.
- **Funding and financial sustainability:** Adequate funding for asset management is essential for maintaining and improving infrastructure assets. Balancing the need for infrastructure investment with the availability of financial resources is a significant challenge.
- **Increasing demands and growth:** Infrastructure needs to be anticipated and planned for future growth, including accommodating changes in demand, land use, and technological advancements.
- **Technology and digitalisation:** The rapid advancement of technology presents opportunities for improved asset monitoring, predictive maintenance, and optimisation. However, implementing and integrating technology effectively and managing digital assets pose challenges related to data management, cybersecurity, and upskilling the workforce.
- **Collaboration and stakeholder engagement:** Effective collaboration, stakeholder engagement, and communication are essential for addressing shared challenges, managing expectations, and achieving desirable outcomes.

Sector	Asset importance to service function	Specific asset management regulation	Asset value (\$ billion)	Majority ownership
Energy - Electricity	High	Yes	43.1	Private
Energy - Gas	High	Yes	1.1	Private
Energy - Liquid fuels	High	No	NA	Private
Telecommunications	High	Mixed	14.9	Private
Water and waste: Three waters	High	Yes, but under reform	23.7	Local govt
Waste and resource recovery	High	Mixed	6.3	Local govt
Water and waste: Flood protection	High	Mixed	NA	Local govt
Water and waste: Irrigation	Low	No	NA	Mixed
Transport: Local roads	High	Yes	83.7	Local govt
Transport: State highways	High	No	74.4	Central govt
Transport: Rail	High	No	10.3	Central govt
Transport: Air	High	No	9.1	Mixed
Transport: Sea	High	No	4.5	Mixed
Health: Public sector	High	Yes, but new org	23.3	Central govt
Health: Private sector	Medium	No		Private
Community: Social housing	High	Kāinga Ora only	39.1	Mixed
Community: Community buildings	High	Some	NA - not available	Mixed
Community: Parks and open spaces	Medium	Some	NA	Mixed
Education: Primary and secondary	High	Yes	42.5	Central govt
Education: Tertiary	High	Yes		Mixed
Other: Justice	Medium	Yes	7.1	Central govt
Other: Defence	High	Yes	10.2	Central govt
Other: Land and forestry	Medium	Yes (LINZ / DoC)	NA	Mixed

Table 2-1: Infrastructure sectors

Note that the split of reported or “depreciated” asset values into sectors are estimates calculated by Te Waihangā and are based on higher level published sources, including the SNZ National Accounts, Infrastructure Provider Annual Reports, Local Authority Financial Statistics (LAFS), OECD International Transport Forum (ITF) and the Commerce Commission. The reported values are likely to significantly less than replacement value of infrastructure.

2.3 About this state of play

2.3.1 Purpose

The purpose of this State of Play report was to gather, assess and report on the baseline asset management maturity of the infrastructure system and examine the regulatory frameworks, funding incentives, capabilities and behaviours that drive our infrastructure outcomes and recommend priority areas for action.

2.3.2 Project approach

An initial key objective for the project was to derive a maturity assessment for all infrastructure sectors. The project focus turned more to identifying the key themes and key improvement recommendations, given that asset management maturity results did not exist or were not made available for many sectors. We, therefore, supplemented the maturity evidence provided, with a top-down approach to deriving sector maturity assessments based on the reviewers' knowledge of the sectors, publicly available information, additional information that organisations were willing to share, and interviews with sector representatives. There are limitations to the report given the breadth of the sectors, and the lack of publicly available information. The assessments of asset management maturity were undertaken in late 2022 and early 2023, and do not reflect any changes since then. Detailed findings for each sector are included in appendix six.

An important outcome from the project was to identify recommendations and solutions to improve infrastructure asset management that lead to better infrastructure management in New Zealand.

2.3.3 Identifying effective settings and practice

As part of this project, we identified effective settings and practices across the infrastructure system and have identified these across three layers:

- **System settings** include things such as government policy and regulation, workforce capability and capacity, funding availability and organisational models that operate across sectors and/or organisational types. These are discussed in section three.
- **Sector settings** are settings like those identified above, specific to each sector. Sector settings that are encouraging good practice have been identified along with that effective practice delivered by organisations. These are covered for each sector in appendix six.
- **Sector asset management practice** is the collective maturity of the sector compiled by an understanding of the asset management practices of each organisation in the sector (strategic setting, level of service and demand planning, lifecycle decision-making and delivery, enablers such as people management, asset information, outsourcing practices, and continual improvement). This is covered in appendix six.

2.3.4 Report structure

This report considers first what asset management is and the context of asset management in New Zealand in section two. The wider system settings across sectors is discussed in section three. Section four includes an overview of the asset management maturity elements across the whole infrastructure system, including what works, challenges and recommendations.

We conclude that there is real opportunity to improve asset management in New Zealand to lead to better services and wellbeing for New Zealanders including leveraging more advanced asset

management practice to lower-maturity sectors. In section five, we detail more about what comes next and what the recommendations could do to improve critical services and infrastructure.

Appendix one of this report identifies the overall asset management maturity assessment model used in the report. Appendix two shows the different types of organisations involved in asset management, and appendices three, four and five list the regulations and legislation, acronyms, definitions and references used in this report. Appendix six has sections on each of the 23 sectors reviewed and assessed to compile this report. Each sector section includes a sector overview, asset performance, asset management maturity, industry guidance and regulation, challenges, and recommendations.

In completing this report, four themes were identified for improvement actions. These are:

- Governance,
- Transparency,
- Resilience, and
- Productivity

The recommendations in each system setting, element, and sector are categorised under these themes so that common approaches may be considered.

The report structure is illustrated in Figure 2-2. This shows the asset management elements and system settings that make up sections three and four of this report.



Figure 2-2: Summary of report content

2.4 About asset management

2.4.1 What is asset management?

There is no shortage of definitions of asset management, but let's start with one from the international standard for asset management, ISO 55000:

Asset management: the coordinated activity of an organisation to realise value from assets.

The definition recognises that asset-based businesses exist to provide value to customers through delivery of services. It further highlights that asset management requires coordinated activity across the organisation (i.e., is not a siloed function) as it has links to, and elements of, finance, risk, strategic planning, operational delivery and performance management, among others.

The following definition from the IIMM 2020⁹ brings in the concept of lifecycle management more explicitly:

Asset management: the systematic and coordinated activities and practices of an organisation to optimally and sustainably deliver on its objectives through the cost-effective lifecycle management of assets.

This definition highlights that assets need to be managed through their lifecycle, as illustrated in Figure 2-3, rather than the historic "build-and-forget-until-it-falls-apart" mentality that dominated infrastructure development in the late 20th century (and which unfortunately continues today in some sectors).

The IIMM further expands on the key features of infrastructure asset management as:

- providing a defined level of service that meets stakeholder needs, and monitoring performance in relation to those levels of service.
- managing the impact of demand changes (growth as well as decline) through demand management, infrastructure investment and other strategies.
- taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet that defined level of service.
- identifying, assessing, and appropriately controlling risks.
- having a long-term financial plan which identifies required expenditure and how it will be funded.



Figure 2-3: Asset lifecycle management (IIMM Fig 1.2.2.1)

⁹ IIMM digital edition, available for purchase at [International Infrastructure Management Manual \(IIMM\) - Institute of Public Works Engineering Australasia \(ipwea.org\)](https://www.ipwea.org/)

These are enabled through aspects such as capable staff, effective tools and systems and a commitment to continuous improvement in asset management.

2.4.2 The case for asset management

Infrastructure services are an important contributor to wellbeing. New Zealanders make heavy use of infrastructure every day, to participate in society and contribute to the economy. The consequences of infrastructure failures on communities are frequently in media headlines, along with debate around whether these failures could / should have been avoided through better asset management.

The benefits of asset management are generally recognised as being stronger governance and accountability, alignment of service levels with customer and stakeholder needs, robust and evidence-based asset investment decisions, effective risk management, improved financial performance, improved operational efficiency and effectiveness, stakeholder assurance and many others (ISO 55000, IIMM, IAM).

The challenge is to find proven case studies that demonstrate the benefits of improving asset management in economic terms. Many organisations use asset management maturity assessments to demonstrate improvements, but at the beginning of the asset management journey there is usually limited baseline data to demonstrate specific performance improvements or financial efficiencies. Therefore, many case studies that demonstrate the benefits of asset management cannot quantify financial benefits or, where these can, they relate to tangential benefits from performance-based outsourcing in a competitive market.

A further challenge is that an important benefit of asset management is the consequences that are avoided – the critical asset that didn't fail and cause significant economic losses. Risk management frameworks try to quantify this risk-avoidance benefit but, again, there needs to be a good evidence base to demonstrate that likelihood or consequences of a risk have been reduced.

Despite these challenges, there is a huge range of case study material that demonstrates asset management benefits (even if not in economic returns) – in industry guidelines such as the Āpōpō Guide and IIMM, and reports by regulators and auditors such as the Office of the Auditor-General. Internationally, the UN-published *Managing Infrastructure Assets for Sustainable Development: A Handbook for Local and National Governments* identifies asset management benefits on page five¹⁰.

2.4.3 Asset management to improve community outcomes

Mature asset management practices enable a more effective “customer” or “stakeholder” voice to influence the levels of services that they experience and pay for either directly or indirectly through rates and taxes. For example, there is currently limited transparency on the risk levels New Zealand as a country is carrying in terms of infrastructure, particularly for “users” who are often the eventual funders of infrastructure (we discuss this further in section four). Improved asset management could improve customer and stakeholder engagement, including iwi engagement as it provides a long-term, multi-generational view aligned with kaitiakitanga.

¹⁰ Navid Hanif, Caroline Lombardo, Daniel Platz, Claire Chan, Jaffer Machano, Dmitry Pozhidaev and Suresh Balakrishnan, eds., *Managing Infrastructure Assets for Sustainable Development: A Handbook for Local and National Governments* (New York, United Nations, 2021)

As part of an integrated planning framework, levels of service should be reviewed and consulted on to ensure the appropriate trade-offs are made both within sectors and across infrastructure more generally. For example:

- Have we got the right mix of appropriate quality properties for health and education facilities?
- Should we invest in managing the interdependencies between infrastructure networks, such as by prioritising investment in networks on which most others are dependent to function (e.g., electricity)?
- How do we plan to ensure that all underground services beneath roads are maintained or renewed in a considered approach to increase effectiveness and productivity of the network of infrastructure, so we don't need to keep digging up the same section of road and unnecessarily disrupting communities?
- How do central and local government work together to ensure the optimal “portfolio view” and “spatial plan” of infrastructure investment across New Zealand?

Organisations may have high levels of asset management maturity, but that may not always be reflected in asset performance and service outcomes. The disconnect most often occurs in decision-making, where asset management may be disregarded and/or asset management plans may be left on the “shelf”. In addition, asset management artefacts may not be appropriate for use by decision-makers and/or not integrated into the overall planning and investment processes. The focus solely on business cases by some organisations as an investment control may be a factor. We discuss these issues further in section three.

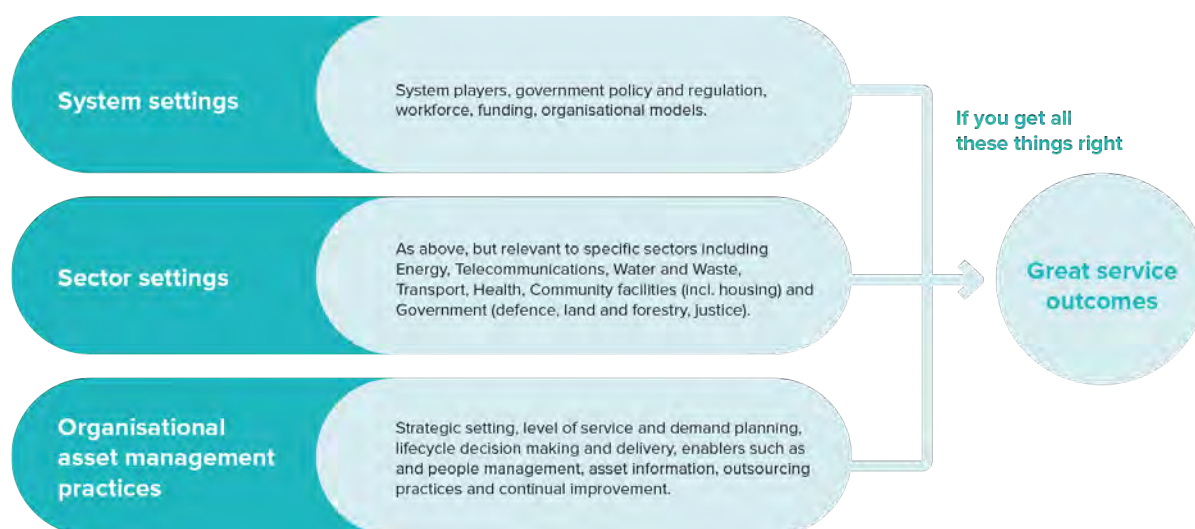


Figure 2-4: The infrastructure system delivering service outcomes

2.5 Asset management in New Zealand

2.5.1 Scope of asset management

Asset management often means different things to different people and organisations. More traditional approaches in some sectors have focussed only on the management of existing assets, their condition/performance and required investment to maintain and renew the assets over the lifecycle.

The key tenet of asset management is balancing risk, cost, and services across the life of assets for present and future customers. This can include environmental, financial, and social imperatives as well as resilience.

Good practice in asset management takes a more holistic and strategic approach, starting with analysis of strategic and customer requirements and translating those through into optimised operational and capital strategies and programmes. The functions of asset management defined in the IIMM Asset Management Maturity Framework, ISO 55000 standards and the Institute of Asset Management (IAM) take this broader approach (refer next section).

However, in defining asset management, it can be useful to consider what's excluded as well as what's included, and which parts of the organisation need to interface with the Asset Management System. This is illustrated in Figure 2-5 below.

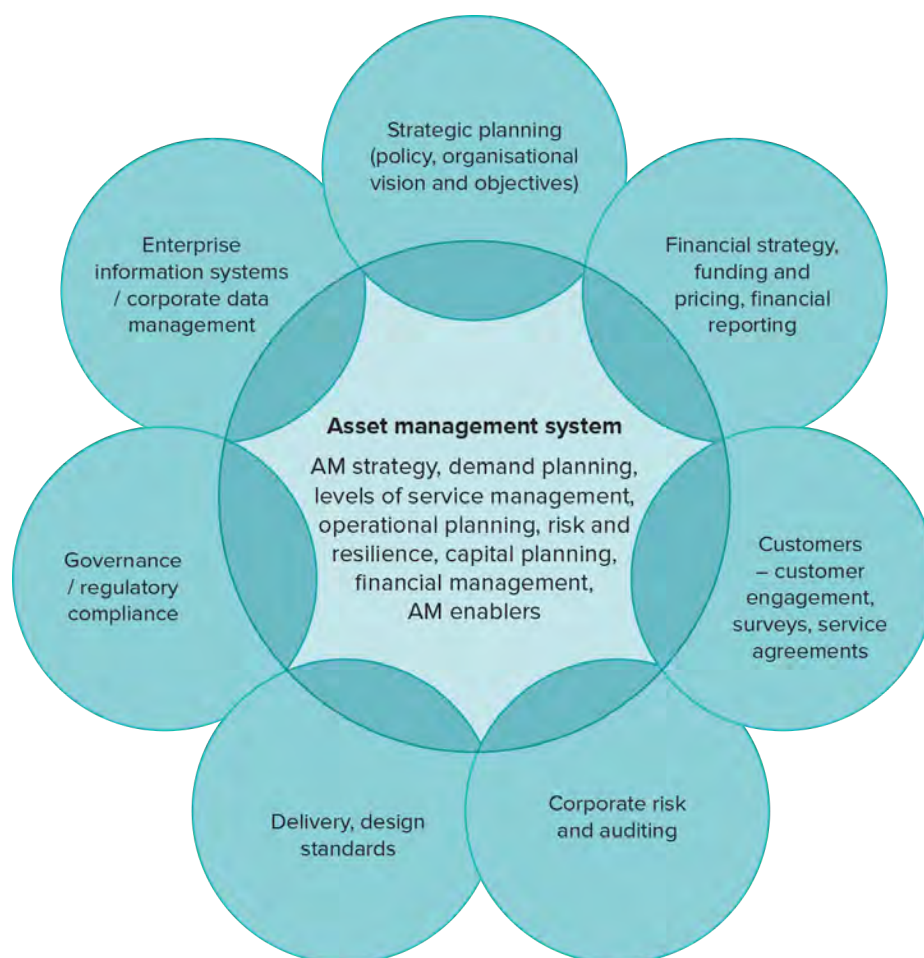


Figure 2-5: The asset management system and relationship with other organisational functions

2.5.2 The early days

New Zealand has been regarded internationally, along with Australia, as having some of the leading practices in the world. A key driver has been early legislation (from the late 1990s) that required long-term financial planning by local government organisations. This led to the widespread development of asset management plans in the local government sector, though these are of widely varying quality.

The legislation was followed with the establishment of an industry group, the National Asset Management Steering Group (NAMS Group), which developed the IIMM (in partnership with an equivalent body in

Australia) to provide guidelines for a consistent, good practice approach to asset management. The NAMS Group included important parties such as the Office of the Auditor General, which provided the stick to accompany the carrot (the carrot being the benefits of asset management in the IIMM).

There were specific events or infrastructure failures that have catalysed efforts into asset management and infrastructure reform at various times. This included the 1998 Auckland power crisis and the Havelock North water campylobacter outbreak in 2016.

There have been subsequent legislated requirements for asset management planning in many other sectors, and in the electricity sector much more detailed regulatory and disclosure requirements as part of price-quality regulation. The New Zealand government established the ICR system in 2016 which included an asset management maturity assessment and asset performance requirement, but the ICR was put on hold in 2021 and is now discontinued. This was intended to drive awareness of, and improvements in, asset management practices in asset-intensive central government and Crown entities.

2.5.3 Evolving with international standards and practice

The ISO 55000 asset management standards were introduced in 2014, with New Zealand represented on the 55000 review panels indirectly through Standards Australia. Direct input into the ISO 55000 standards through Standards New Zealand is currently being investigated. The development of the standards has reflected growing interest in, and development of improved asset management practices in many other countries, some of which have arguably caught up, if not overtaken, New Zealand practice in some areas.

2.5.4 The Māori context

Engagement with Māori in relation to infrastructure management has historically been before and during major project developments and in relation to specific resource consent applications. This consultation is required under the Resource Management Act, largely due to Māori interests as land and resource-owners and neighbours / impacted parties of the development.

As the general understanding of Te Tiriti o Waitangi obligations and opportunities becomes mainstreamed, prompted by government policy and legislation, it is being recognised that Māori have both a right and obligation to make a fundamental contribution to asset management practice through the application of the historically ignored te ao Māori (a Māori world view).

Māori knowledge (Mātauranga Māori) is embedded in the relationship between people and natural resources, often connected with their kinship (whanaungatanga). An intergenerational view leads naturally to a strong focus on sustainable business, organisational, social, cultural, and environmental practices to ensure future generations enjoy the benefits of the natural resources that are in use today. This is often expressed as fulfilling the responsibility to be guardians (kaitiaki) of the land and the resources under and on it. There is still some work to do to understand the best way for infrastructure providers to weave together the best of globally sourced asset management practices, culture, and knowledge with Mātauranga Māori, te ao Māori and tikanga so as to achieve optimal management of infrastructure assets and the use of natural resources in providing community outcomes derived from those assets.

Asset management principles and kaitiakitanga are well aligned in pursuing a framework for consultation over service levels and a longer-term view. However, industry asset management guidance is largely absent in the areas of Te ao Māori, tikanga and Mātauranga Māori. There are various initiatives underway to address this gap, for example, Āpōpō – Infrastructure Asset Management Professionals (formerly IPWEA NZ) has developed an infrastructure asset management guideline that is tailored to the unique

context of Aotearoa New Zealand. Most sectors and organisations are working to better incorporate Māori values into infrastructure planning and delivery.

2.6 Asset management maturity

Asset management maturity assessment frameworks are used to assess the capability and performance of the organisation’s asset management system. A key purpose is to derive an improvement plan from the analysis of the gap between current and future appropriate maturity scores. Asset management maturity frameworks are useful to demonstrate to governance bodies that the organisation has robust asset management practices that compare well with other similar organisations.

There are many frameworks used internationally, with the most common ones summarised below. These asset management maturity frameworks are generally useful and appropriate, they just provide a different framework and structure with the same end goal in mind: an appropriately mature asset management system. However, each is dependent on the organisation’s needs and regard for the level of risk, compliance, or alignment they are seeking. For many organisations, the ability to benchmark within the sector and/or internationally is important.

2.6.1 New Zealand practice

Currently there are many different asset management maturity assessment frameworks and tools in use in New Zealand (frameworks set out a structure and measurement system, whereas tools are the databases and spreadsheets that organisations can use to undertake an assessment). The most widely used are:

1. **ISO 55001** based maturity assessment frameworks such as those by the Institute of Asset Management in the UK are increasingly being used outside of central and local government, notably in the electricity and telecommunications sector. ISO 55000 is an international series of standards that has attempted to create a common language and approach for asset management. It is a popular framework for large organisations, and particularly the electricity industry globally.
2. The **IPWEA-IIMM Maturity Assessment Framework (IIMM AMMA)** is commonly used in local and central government, and a slightly simplified version is used as a basis for asset management maturity reporting in this report. The IIMM AMMA was extensively overhauled in 2020 with the aim of ensuring it captures all ISO 55001 requirements and focusses more on “embedded” practice.
3. The **Asset Management Maturity Assessment Tool (AMMAT)** was developed in the electricity sector. Self-assessments against AMMAT are required to be reported every two years by the Commerce Commission for sectors that they regulate.
4. **Consultant-developed tools.** Many consulting firms have developed their own maturity assessment tools, typically based on one or more of the above.

2.6.2 International practice

The IIMM framework is used extensively in Australasia and is built into the IPWEA bodies of knowledge and learning platforms. There have been other tools developed by Australian industry bodies, including

the Australian Asset Management Council assessment tool and the Australian Centre of Excellence for Local Government National Assessment Framework¹¹.

The Institute of Asset Management (IAM) Self-Assessment Methodology+ (SAM+) tool is another commonly used tool, particularly in the UK, based on the requirements of ISO 55001 and the 39 subjects of the IAM Conceptual Model, found in the Global Forum on Maintenance and Asset Management (GFMAM)¹² Landscape.

Every four years, the American Society of Civil Engineers issues an America’s Infrastructure Report Card¹³, and the Environmental Protection Agency (EPA) has guidelines including a reference guide for asset management tools. The United Nations has published the Managing Infrastructure Assets for Sustainable Development Handbook¹⁴ that covers similar elements in this report.

The IIMM AMMA encompasses all ISO 55001 requirements but does have more detail and emphasis in the technical areas of lifecycle decision-making, whereas ISO 55001 follows a standard ISO management-systems structure with more emphasis on organisational settings around leadership, communication, and system controls. The Electricity AMMAT framework is recognised as being dated and is being updated to align with ISO 55000.

2.6.3 Asset management maturity assessment process and quality of data

The asset management maturity assessment frameworks can be used in a variety of ways, from organisational self-assessments to formal external audits. The quality of the results, and ability to use them for comparative analysis with other organisations, varies. IIMM section 4.6 provides more guidance around types of assessments and when they are appropriate.

The asset management maturity assessment used in this report is based on an abridged version of the maturity assessment framework in the IIMM, as it was felt that a reduced number of functions would be more manageable for this enormous piece of work. The abridgements include:

- Combining the strategy and strategic asset management plan elements into a single function called *Strategy*.
- Combining the asset information, asset information systems and asset condition and performance elements into a single *Evidence* function.
- Combining asset management processes and review and improvement elements into a function called *System and Improvement*.

The asset management elements included in this report are identified in *Table 2-2* below:

¹¹ [Managing Infrastructure Assets for Sustainable Development: A Handbook for Local and National Governments | UN DESA Publications](#)

¹² Global Forum on Maintenance & Asset Management, [Asset Management Landscape | GFMAM](#)

¹³ [America's Infrastructure Report Card 2021 | GPA: C-](#)

¹⁴ Navid Hanif, Caroline Lombardo, Daniel Platz, Claire Chan, Jaffer Machano, Dmitry Pozhidaev and Suresh Balakrishnan, eds., *Managing Infrastructure Assets for Sustainable Development: A Handbook for Local and National Governments* (New York, United Nations, 2021)

	Asset management maturity elements <i>Findings presented in section four of this report.</i>	System settings <i>Findings presented in section three of this report.</i>
Understanding requirements	<p>Strategy: Strategic organisational goals and customer priorities are analysed and aligned through a strategic asset management framework (asset management policy, strategic asset management plan and asset management plans).</p> <p>Levels of service: Levels of service (service outcomes) are set through level of service option analysis and engagement with customers. Performance is measured, analysed and reported.</p> <p>Demand: Future demand requirements and scenarios are analysed, and asset constraints are identified. Asset (and non-asset) solutions have been evaluated to match demand and supply.</p>	<p>System players:</p> <p>What system players exists and roles. Inter-relationship of system players. How it all fits together.</p> <p>Legislation and regulation:</p> <p>The extent to which asset management is specifically legislated and regulated.</p> <p>Other regulation that influences asset management maturity, organisational effectiveness and/or service outcomes.</p>
Lifecycle planning	<p>Risk and resilience: Risk and resilience levels are analysed at strategic-operational-asset levels. Risk management mitigations are identified, prioritised and incorporated into asset management plans. Asset risk and criticality has been assessed and is used in lifecycle planning.</p> <p>Operational planning: Operational (incl. maintenance) plans are designed to deliver maximum value. Incident and emergency management arrangements are in place, regularly tested and reviewed.</p> <p>Capital planning: Effective decision frameworks are in place to evaluate the best value options and prioritise projects and programmes. Robust CAPEX project and pipeline management processes are in place.</p> <p>Financial management: Long-term financial forecasts are in place, based on whole-of-life asset costs, and funding strategies are developed. There is a reliable knowledge of asset costs, value and depreciation.</p> <p>Asset management plans: Strategic asset management plans and asset management plans are developed and embedded into business and financial planning processes. They provide the business case for the financial forecasts.</p>	<p>Workforce:</p> <p>The availability of people with the right skills and capabilities at decision-making, tactical and operational levels</p>
Asset management enablers	<p>People: The organisation effectively leads and coordinates asset management. The organisation is structured and people-resourced to deliver asset management objectives.</p> <p>Evidence: A reliable, well-structured asset database is in place to inform asset planning. Information systems enable effective and efficient asset management. Asset condition and performance is understood (past, current, future).</p> <p>Service delivery: Service delivery options are evaluated and effectively procured. Service delivery providers are effectively monitored and controlled.</p> <p>System and improvement: There are well-defined and documented asset management processes that are managed within a quality system. The organisation takes a continual improvement approach towards an appropriate level of asset management maturity.</p>	

Table 2-2: Organisational asset management maturity and system setting elements assessed

3. Our infrastructure system settings

3.1 System players

3.1.1 Overview of the infrastructure system players

Infrastructure services are delivered by a range of organisation that operate within a legislative and regulatory framework. This section covers the central agencies and “system players” which operate across multiple sectors and have (or should have) a role in asset management. There are agencies that act as “sector players” such as Electricity Authority, Commerce Commission, Ministry of Transport and NZTA, the Ministry of Business Innovation and Employment (MBIE), and DIA which are discussed in the sector sections in appendix six of this report. The table below summarises the system player roles in relation to asset and infrastructure management.

Agency type	Agency name	Scope (organisation type or sector)	Role in asset and infrastructure management
Central agency	Te Kawa Mataaho - Public Service Commission	All government departments and Crown entities	Responsible for Chief Executive appointments to government departments and boards of Crown entities. Stewardship of assets and long-term financial sustainability should be key performance criteria for CEs of asset-investment government agencies. Responsible for system leads.
	Department of Prime Minister and Cabinet	All government departments and Crown entities	Provides advice to Prime Minister and Cabinet. Includes National Emergency Management Agency (NEMA) and the Critical Infrastructure Resilience Unit, which provides risk and resilience system governance.
	Te Tai Ōhanga - The Treasury	All government departments and Crown entities	Responsible for ensuring effective management of the Government’s assets and liabilities and financial management steward. Sets investment management and asset performance rules for government agencies and Crown entities.
System players	Te Waihanga	Independent advice on all infrastructure	Commissioning reports, advice and advocating for appropriate asset management as part of improving infrastructure.
	Commerce Commission	Economic regulation on a selection of monopoly industries– electricity networks, gas pipelines, telecommunications networks, airports, and work is underway to bring in the water sector.	Sets information disclosures including asset performance and asset management plans as well as reviewing and reporting on performance of the sectors it monitors.
	MBIE	All government departments and Crown entities	Functional lead for procurement and leased commercial property
	DIA	Local government	Administer local government legislation and provide policy advice including infrastructure reform.
	Office of the Auditor General	Under the Public Audit Act 2001, carries out annual audits, performance audits, other assurance services, inquiries (limited reporting functions only), and the Controller function for government departments.	Responsible for audit standards and audits of public sector entities including annual reports and statements of service performance. Audits asset management evidence to support local government Long-Term Plans and renewal forecasts and provides reviews and advice for the sector.

Table 3-1 System player scope and roles

3.1.2 System player roles - Central agencies

The Department of the Prime Minister and Cabinet, the Public Service Commission and the Treasury are the three central agencies responsible for coordinating and managing Public Service performance. This includes government departments and Crown entities, who must comply with the rules and frameworks they set.

Te Kawa Mataaho - Public Service Commission

The Public Service Commission (PSC) coordinates the Public Service as a whole and provides guidance to all the individual agencies and their chief executives.

PSC is responsible under the Public Service Act 2020 to provide leadership of the public service, including the performance and integrity of the system. This includes acting as the “employer” appointing Chief Executives for the public service and some independent boards. The PSC advises on improvements to the performance, function, and structure of the public service system and reviews the performance of departments and departmental agencies. There are no specific functions relating to assets for the PSC.

Management of assets is not identified specifically as a responsibility for public sector Chief Executives by the PSC and is covered more broadly under “performance and operation of their agency”. Cabinet Office Circular CO(23)9¹⁵ identifies that departmental Chief Executives are responsible for the performance of the department’s investments and assets, including any non-departmental assets they manage on the Crown’s behalf. A new requirement is that Chief Executives will need to “attest” to the compliance of CO(23)9.

Department of Prime Minister and Cabinet

The Department of the Prime Minister and Cabinet (DPMC) is responsible for providing advice and support to the Prime Minister, the Governor-General and Cabinet and supporting the responsibilities of its other portfolio ministers, as well as hosting the National Emergency Management Agency (NEMA).

DPMC is the lead advisor on:

- Risk and resilience – lead by the Risk and Systems Governance Group
- Emergency management – lead by the National Emergency Management Agency
- National security – lead by the National Security Group. This includes the Critical Infrastructure Resilient Unit which leads work to enhance the management and resilience of New Zealand’s critical infrastructure system against all hazards and threats.

Te Tai Ōhanga - The Treasury

Te Tai Ōhanga – The Treasury is the lead economic and financial adviser to the Government and steward of the public sector financial management and regulatory systems.

¹⁵ [CO \(23\) 9: Investment Management and Asset Performance in Departments and Other Entities - 18 September 2023 - Cabinet Office \(dPMC.govt.nz\)](https://www.dPMC.govt.nz)

The Treasury's vision is to lift living standards for all New Zealanders. It provides advice to the Government on its overarching economic framework and fiscal strategy and how to achieve value for money from its investments. It is responsible for publishing financial statements and economic and fiscal forecasts and ensuring effective management of the Crown's assets and liabilities.

The Treasury is responsible for investment management more generally and sets rules through providing advice on relevant Cabinet Office circulars.

In September 2023, CO (19)6 Investment Management and Asset Performance was superseded by CO(23)9¹⁶. There are several changes in this update, the most significant requiring Chief Executives of government departments and Crown agencies to "attest" that departments and agencies are complying with the requirements of the circular.

There is greater emphasis on quarterly investment intention reporting, and increased emphasis on resilience and risk of service critical assets. The Cabinet Office Circular now requires that asset management plans that inform strategic, tactical, and operational choices, need to be maintained. Overall, our assessment is that the changes are practical and make sense and should increase accountability for departments and Crown entities. The circular does not require publishing of plans and information other than reporting on relevant asset performance indicators of service critical assets in their annual reports¹⁷. This State of Play report recommends that there is more transparency of central government infrastructure given its criticality and public funding, and that asset management plans are published or available on organisational websites.

There is currently very limited guidance or material available specifically for departments and Crown agencies so each agency could be "reinventing the wheel" in terms of asset management, which may not be the most effective approach. Treasury has recently published high-level asset management guidance and identifies that more guidance will be completed in 2024¹⁸. A more defined "target" state such as the Victorian State Asset Management Accountability Framework¹⁹ should be considered to give agencies clarity about the target and leverage resources across the sector to deliver asset management practice more effectively and consistently.

The Treasury for the state of Victoria in Australia implemented an Asset Management Accountability Framework in 2016. This is a flexible and non-prescriptive set of requirements to ensure public sector Accountable Officers manage asset portfolios appropriately. It includes mandatory requirements, and the Treasury produces guidance documents. The framework aligns to New Zealand investment management products such as Better Business Cases and Gateway Reviews.

[Asset management accountability framework | Department of Treasury and Finance Victoria \(dtf.vic.gov.au\)](https://www.dtf.vic.gov.au/asset-management-accountability-framework)

¹⁶ [CO \(23\) 9: Investment Management and Asset Performance in Departments and Other Entities | Department of the Prime Minister and Cabinet \(DPMC\)](#)

¹⁷ [Para 36 of CO \(23\) 9: Investment Management and Asset Performance in Departments and Other Entities | Department of the Prime Minister and Cabinet \(DPMC\)](#)

¹⁸ [Asset Management Guidance for Agencies | The Treasury New Zealand](#)

¹⁹ [Asset management accountability framework | Department of Treasury and Finance Victoria \(dtf.vic.gov.au\)](https://www.dtf.vic.gov.au/asset-management-accountability-framework)

The public sector accountability framework that was first established in 1989 and since then the core Crown physical assets have grown substantially to \$267 billion at the end of June 2023. The Treasury has both an Investment Management System team as well as the National Infrastructure Unit and is required to complete an Investment Statement at least every four years. Treasury previously published National Infrastructure Strategy reports but that is now transferred to Te Waihanga. The Treasury is responsible for balance sheet management policy, and the Government financial accounts.

The Public Finance Act 1989 (PFA) has been amended over time to require the Treasury to publish additional reports that include some content relating to assets including the Fiscal Strategy Report²⁰, Statement on Long-term Fiscal Position²¹, and the Investment Statement²².

These documents require reporting on physical asset values but not asset performance. This means there is limited transparency of the management and performance of government assets both at an agency level and from a central level. There is limited reporting and forecasting required over longer time-periods which is generally where asset management and infrastructure investment is most likely to impact. The long-term fiscal position report is the only report that must relate to the period of at least 40 consecutive financial years²³. Most Treasury reports have a 4-year time horizon aligned to budget allowances. We consider at the minimum there should be a 50-year high level financial and renewal view of long-life horizontal and built infrastructure.

3.1.3 System player roles – System players and leads

System players and system leads have various roles across defined sectors or asset types:

The most recent Treasury investment statement published in 2022 makes the following statements about asset management (summarised extracts):

*As the balance sheet grows, there is a significant opportunity cost of ownership – approximately \$22 billion per annum at the current public sector discount rate of 5% per annum. Even small improvements in the outcomes the government receives from ownership – across financial and physical capital, human capability, social cohesion, and the natural environment – can make a significant contribution towards living standards. **Key areas for potential improvement are the quality of asset management**, and ongoing assessment of whether ownership remains the right intervention to support government objectives.*

*While New Zealand's foundations are robust, **there is evidence that government investment management and asset management practices are not universally mature or high performing**. Asset management practices are inconsistent, while the incentives to maintain assets well or look at ways to improve value for money are often limited.*

²⁰ [Fiscal strategy | The Treasury New Zealand](#)

²¹ [Long-term fiscal position | The Treasury New Zealand](#)

²² [Investment statements | The Treasury New Zealand](#)

²³ [Public Finance Act 1989 No 44 \(as at 27 July 2023\), Public Act 26N Statement on long-term fiscal position – New Zealand Legislation](#), section 26N

The New Zealand Infrastructure Commission, Te Waihangā

The New Zealand Infrastructure Commission, Te Waihangā was officially formed by the New Zealand Infrastructure Commission/Te Waihangā Act 2019²⁴. Te Waihangā is an Autonomous Crown Entity with an independent board. The main function is to co-ordinate, develop, and promote an approach to infrastructure that encourages infrastructure, and services that result from the infrastructure, that improve the well-being of New Zealanders²⁵. This includes a strategy and planning function including the requirement to publish an Infrastructure Strategy report.

Te Waihangā commissioned this Asset Management State of Play report and has identified asset management as a key approach to improving infrastructure outcomes.

Commerce Commission

The Commerce Commission, Te Komihana Tauhokohoko, an independent Crown entity, regulates some industries – electricity networks, gas pipelines, telecommunications networks, airports and water. The Commerce Commission has had a focus on monitoring and encouraging participants in the industries it regulates to improve their asset management practices. Economic regulation is used to drive and incentivise this. It has released several reports recently regarding asset management, especially in relation to the electricity networks and gas pipelines industries²⁶.

The Commerce Commission has recently established an Infrastructure Regulation Branch to concentrate and improve its focus on those monopoly sectors it regulates.

Te Tari Taiwhenua Department of Internal Affairs

DIA's local government group is responsible for administering local government legislation such as the Local Government Act 2002 (LGA), and regulation on behalf of the Minister. DIA provide policy advice on the structure and responsibilities of local government and leading local government reform²⁷ including water services reform.

Local government manage significant local infrastructure in communities such as local roads, community facilities, parks and reserves, and water services.

*This current set of stewardship arrangements was established over time to address immediate issues and each organisation brings its own lens. There is no clear high-level picture of **what is good for the local government system** as a whole, but rather a complex, overlapping, and often disjointed web of responsibilities.*

[Future for Local Government Review - dia.govt.nz](#) page 111

Ministry of Business, Innovation and Employment

MBIE is the functional lead for procurement and Government Rules of Sourcing and leased commercial office space across the public sector through the Government Property Group. The Government Rules of

²⁴ [New Zealand Infrastructure Commission/Te Waihangā Act 2019](#)

²⁵ [New Zealand Infrastructure Commission/Te Waihangā Act 2019 No 51 \(as at 01 September 2022\), Public Act 9 Main function of Commission – New Zealand Legislation](#), section 9

²⁶ [Commerce Commission - Review of Electricity Distribution Businesses' 2021 Asset Management Plans in relation to decarbonisation \(comcom.govt.nz\)](#); and Reporting of asset management practices by electricity distributors – 2019 [Commerce Commission - Reporting of asset management practices by electricity distributors \(comcom.govt.nz\)](#)

²⁷ [Future for Local Government Review - dia.govt.nz](#)

Sourcing have a large impact on the delivery of Government infrastructure as all design and delivery is outsourced. It provides policy and oversight of the Energy and Telecommunications sectors.

3.1.4 External audit

Office of the Auditor General

Under the Public Audit Act 2001, the Controller and Auditor-General carries out annual audits, performance audits, other auditing or assurance services and inquiries. The OAG has been a staunch supporter of improving asset management for decades and has completed several reports with strong recommendations at a sector-level (such as reports specifically on health and local government²⁸) and more generally. They have published guidance for asset management, in particular targeting decision-makers with questions they should ask²⁹.

The pre-able to the latest priorities for the OAG identifies the following:

“Preparing for the next natural disaster at either a local or national level continues to put pressure on emergency management resources. Historical under-investment in infrastructure is continuing to result in highly visible asset failures and service disruptions.”³⁰.

The OAG is responsible for audit standards and assigns external auditors to central and local government agencies within their scope, which may include Audit New Zealand or private sector auditors. Under the LGA there is a requirement for Long-Term Plans (LTP) to be externally audited, and the audit standard has included a review of local government asset management evidence to support the LTP.

In Korea, the 2020- 2025 Master Plan is a nation-wide policy planning on systematic maintenance and management of infrastructure and improvement of infrastructure performance. Main tasks of the Plan consist of four pillars as follows: (1) establish comprehensive and pre-emptive maintenance and management governance system, (2) increase level of infrastructure maintenance overseeing, and decrease blind spots, (3) establish foundation for 'smart maintenance and management of infrastructure' and promote related industries, (4) invest in preventive safety measures for aged infrastructure and diversify investment sources.

3.1.5 What does good look like for system players?

The points below identify good examples of practice that has led to better asset management or outcomes.

- Clearly defined system player roles and responsibilities in the infrastructure system, with accountable agencies actively and effectively undertaking these roles consistently over time.
- System Players work cooperatively to support improved infrastructure asset management (e.g., the NAMS Group used to have active working groups with local government sectors, Audit Office, finance

²⁸ [Part 2: Councils' investment in infrastructure — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](#) and [Part 4: How councils manage their assets — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](#)

²⁹ [Part 6: Questions decision-makers should ask themselves — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](#)

³⁰ [Part 1: How we determine our work programme — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](#)

people, engineers, economists, communications people collectively developing content like the Depreciation and Valuation Guidelines).

- Economic regulation with active compliance and scrutiny is probably the best model that operates in New Zealand.
- There has been an improvement in economic forecasting of construction and infrastructure sectors but still high-level and doesn't appear to be informing system setting and integrated planning. The accuracy of the forecasting is still variable with varying levels of base data feeding through from organisations and sectors.
- Guidance from the "centre" such as the State of Victoria (Australia) Asset Management framework and co-ordination such as the Korea 2020-2025 Master Plan³¹.

3.1.6 System player issues

- **There is no overall asset management lead identified within government**, this may not need a separate organisation but clearly identifying a "system lead" for asset management or stewardship should be considered.
- **Asset management is such a large gap in central agency settings it is isn't even acknowledged as a gap.** The Treasury requirements under CO(19)6 Investment Management and Asset Performance were sound but were not universally enforced and there were no incentives or checks to ensure that asset management is occurring and informing decision-making. The new circular CO(23)9 requires Chief Executives to sign an attestation that the organisation they lead is complying (or perhaps otherwise) with the requirements of the Cabinet Office circular.
- **Local government asset management plans often aren't effectively used in long-term planning and decision making**, and they are sometimes seen as "wasted effort" especially to politicians given the short electoral cycle.
- **There is limited transparency and reporting on infrastructure performance** (including condition) for all infrastructure types at any level, and for any audience. Further, there is no consolidated asset performance data to inform advice and government decision-making.
- **There is a lack of medium to long-term accountability for infrastructure planning and performance** and this accumulates through organisational, sector and system layers.
- **Government planning and investment decisions on specific initiatives are often made in silos.**
- **Budget processes are designed for operating appropriations and not long-term capital requirements**, which can lead to sub-optimal decisions as capital renewal initiatives may be deprioritised or deferred due to process issues.
- **The system settings and organisation types are complex given the scale and population of New Zealand.** The range of organisation size causes different practices and levels of asset maturity across the sector from organisations that are delivering similar services.

³¹ OECD (2021), "Building resilience: New strategies for strengthening infrastructure resilience and maintenance", OECD Public Governance Policy Papers, No. 05, OECD Publishing, Paris, <https://doi.org/10.1787/354aa2aa-en>

- **Political cycles are not conducive to making effective long-term decisions about very long-life infrastructure.** Ribbon-cutting on new infrastructure is attractive politically but can lead to long-term cost impacts over the life of the infrastructure. Although crises such as cyclones and earthquakes highlight the importance of infrastructure investment, historically this attention has waned quickly. Effective asset management tends to reside in organisations that are more heavily influenced by regulatory bodies such as the electricity sector or are distanced from the short-term political cycle.
- **For organisations that have a primary service role, such as health, education, and justice, it can prove difficult for asset managers to influence decision-making.** They are rightly focused on providing primary services to New Zealanders, but there is often under-investment in key infrastructure assets such as the buildings that then negatively affect service delivery over a longer timeframe. Other sectors such as state highways or electricity distribution, have the infrastructure assets as their primary focus, and are not subject to as many competing interests.

3.1.7 System player recommendations

Governance

1. Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.

We believe that a capable and resourced asset management system lead will provide oversight and alignment of asset management requirements and regulation across sectors, as well as verifying compliance with these requirements. The system lead could support the DIA and Commerce Commission in their respective roles in asset management.

A system lead could be established under the Public Sector Act 2023 to provide leadership across government departments and Crown entities. This could be an existing agency, or clear responsibilities within several agencies, but the system lead would need to be sufficiently resourced with asset management capability and have an appropriate mandate. The system lead could have responsibilities across sectors and support the DIA and Commerce Commission in their respective roles in asset management. We believe that a capable and appropriately resourced asset management system lead could action the following:

- *provide oversight and alignment of asset management requirements and regulation across sectors*
- *ensure appropriate asset management governance exists at an organisational level*
- *verify compliance or otherwise of requirements in relation to asset management such as the Cabinet Office Circular CO(23)9, the LGA and other legislative asset management requirements.*
- *set a consistent asset management framework, and asset performance measures*
- *measure and report on asset management maturity and provide advice on targets and appropriate practice to lift asset management practice and performance*
- *raise asset management awareness at governance and leadership levels including building the right skillsets, ensuring the right questions are being asked and asset management understanding is valued appropriately by Board and Executive members*
- *asset management workforce development and forecasting*
- *report on asset management and asset performance across sectors to measure progress over the medium and long-term*
- *facilitate sharing of good asset management practice across sectors*
- *ensure there is appropriate accountability and oversight for implementation of agreed asset management improvement actions.*

We note that there is currently no “home” or organisation undertaking these activities. One of the key observations is that there is a failure across all infrastructure sectors to consistently invest in asset management improvement activities. There is currently a lack of accountability for the asset management improvement plans and no consequences for inaction.

Given the value of Crown property, plant and equipment at \$267 billion, and the lower asset management maturity identified across central government agencies in this report, we think focusing on central government and Crown entities in the first instance is required and this could be more easily achieved within existing organisational structures.

2. Key Recommendation 2: Require all public major infrastructure providers to have an identified and accountable governance body and/or executive lead for asset management. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

There is a lack of understanding of asset management at the governance level in many infrastructure providers in New Zealand. Asset managers are failing to convince decision-makers of the benefits of asset management, and in turn asset management governance and leadership is lacking in many organisations. There is a lack of leadership and sharing appropriate practice and expertise across central government and Crown entities where asset management practice is lowest.

We want organisations to care about asset management and be responsible for stewardship of our assets over the long-term including adapting to climate change. We want someone to be accountable such as the Person Conducting a Business Unit (PCBU) under the Health and Safety at Work Act 2015. This could be a specific role/person or a governance committee e.g., some local government organisations now have a Chief Infrastructure/Asset Officer on the executive team.

Productivity

3. Develop an accountability framework defining asset management roles and responsibilities for central agencies and system players, including where there are dependencies and overlaps in the asset, infrastructure, and investment space.

It can be unclear what agency is responsible for what, and it is complex for others to identify requirements and accountability at a system level. The State of Victoria Asset Management Accountability Framework is a good example that could be leveraged.

4. Establish a consistent long-term planning framework (including consideration of the planning horizon i.e., 10-years detail with 30 years high-level plans) across central and local government.

Consistent long-term planning requirements across at least central and local government could align key infrastructure provision and funding decisions. A key issue is making sure plans are appropriately reviewed and scrutinised so that planning documents don’t become a compliance exercise.

3.2 Legislation and regulation

3.2.1 Overview of legislation and regulation

General

New Zealand has a comparatively un-regulated infrastructure sector, outside of the energy sector, compared to other countries such as Australia (refer to the Australian Competition and Consumer

Commission website³²). A new water regulator Taumata Arowai has now been established. Specific asset management regulation is summarised below and described in more detail in the sector sections in appendix six, along with other legislation that impacts on asset management, both directly and indirectly.

This is relevant to asset management as they state planning emergency levels of service and undertaking risk and business continuity planning. The DPMC critical infrastructure reforms may result in new legislation for critical national infrastructure providers.

Local government

Local government was the first in New Zealand (and probably internationally) to legislate key aspects of asset management practice. In the late 1990s, a requirement to produce long-term financial plans was the first step away from annual budget to budget planning, which often saw maintenance and renewals deferred with lack of understanding of longer-term implications (Local Government Act Amendment 1998).

The LGA required 10-year Long-Term Council Community Plans (now LTPs), stating levels of service, expenditure requirements and other elements of asset management for a period of ten years. The expectation was that asset management plans would provide the evidence base for activities with a large asset base. The Review into the Future for Local Government³³ advised redesigning the LTP process to “significantly reduce the extent of statutory prescription...and make the consultation more meaningful and relevant to communities.”

Central government

In the central government sector, the Cabinet Office Circular CO(23)9 sets the expectations for asset management. As identified previously in this report, the asset management requirements were not being universally enforced.

Regulated sectors

The electricity and gas distribution businesses are regulated by the Commerce Commission with strict disclosure requirements around asset management. This more recently includes telecommunications and fibre companies, and the intention is to bring water in under similar regulations.

Private sectors

Disclosure requirements exist for the retirement village sector, but these are very light on asset management. Private sector organisations have legislation that governs some aspects of asset management but does not always require disclosure of asset management plans or asset performance.

The economic regulation of some infrastructure sectors by the Commerce Commission is considered good practice – this requires disclosure of asset management plans and performance metrics. The Commerce Commission scrutinises the publications and sets price-quality paths (except for consumer-owned distribution businesses).

[Commerce Commission - Regulated industries \(comcom.govt.nz\)](https://www.comcom.govt.nz)

³² Australian Competition and Consumer Commission website ([Regulated infrastructure | ACCC](#))

³³ [He piki tūranga, he piki kōtuku – The future for local government](#) page 110

Audit and external review

Public sector entities are required to be externally audited in line with the Public Audit Act 2001. Most private companies are required to be audited based on legislation and International Financial Reporting Standards. Specific requirements for audits are based on legislation, regulations, and audit standards.

For local government, the external audits include review of asset management evidence to support LTPs.

External auditors have given Gore District and Wellington City Council qualified audit opinions on their 2021-2031 long-term plans due to a lack of asset condition information related to underground water assets.

3.2.2 What does good look like for legislation and regulation?

We shouldn't need legislation or regulation to drive good asset management performance, but what we have found is that without external drivers such as legislation or regulation, many organisations do not give asset management sufficient attention. This is particularly evident at the senior leadership and governance level.

The consequences of failure of electricity distribution infrastructure are the highest in the country, and services are provided by natural monopolies, which supports the need for regulation. The sector is recognised as performing well in both its asset management practices and its outcomes. It is arguable that this may be achieved without regulation, however the power of regulation is that it gives the public a channel for scrutiny by a well-informed independent agency.

Legislation for major infrastructure providers needs to require appropriate asset management, while not prescribing how they should do that. Legislation alone may result in a compliance mentality and does not always result in good practice. Generally, planning needs to go further and do more than is simply required by the legislation and the real objective is that plans, and evidence, inform decisions.

This report recommends greater transparency and consistency by requiring organisations to publish asset management plans and report on performance measures. This may be achieved through legislation or regulation.

The ISO55011.2 guide states that "Government policy-making organisations and officials are recognised as the most powerful participants in the enabling environments for asset management in their respective countries".

3.2.3 Legislation and regulation issues

There is no consistent set of asset management requirements across New Zealand's infrastructure sectors.

The LGA legislation does not always result in good asset management. There are many reasons for this, including councils treating asset management planning as a compliance exercise, short political cycles, poorly written or long-winded asset management plans, a high turnover of staff etc. In the local government sector, auditors review the LTPs of councils and assess whether there is sufficient evidence in asset management plans and other documents and processes to support capital and operating budgets. In 2021, the OAG introduced specific tests on council's renewal forecasting and the do-ability of forecasted renewals. The OAG also publishes findings from the reviews and highlights good case studies.

The Department of Internal Affairs sets compulsory asset related performance measures for local government entities, but the DIA is not responsible for auditing compliance. There is an opportunity to drive consistency across asset management in New Zealand with one authority having the mandate to set specific disclosure requirements and having the authority to monitor and enforce compliance.

Central government asset management requirements had not been enforced. In the central government sector, the previous Cabinet issued CO(19)6 required departments, Crown entities and Crown-owned companies to report on asset performance measures and to have current asset management plans. In practice, the requirement to focus on asset management in central government organisations has diminished since 2019 as CO(19)6 was not universally enforced. Asset management maturity reviews are no longer being undertaken by Treasury as part of the ICR and these only occurred for investment-intensive agencies. Central government agencies and Crown entities generally have no requirement for external audit of asset management plans or asset performance, and several government departments and Crown entities do not have full coverage of critical infrastructure in up-to-date asset management plans. These agencies were required to include asset performance in financial annual reports under CO(19)6, but this was not audited as part of the performance³⁴ reporting metrics. The new Cabinet Office Circular CO(23)9 intends to remedy this through a requirement for Chief Executives to sign an “attestation” that the circular requirements are met, or more likely that they have a plan to improve compliance over time. This increased agency accountability is expected to improve compliance and signals an increased focus on investment and asset management.

Some private sector infrastructure providers have little regulation or legislation relating to asset management, meaning that there are few consequences for inadequate planning or delivery of critical infrastructure. Some form of disclosure requirements should provide reassurance that these organisations are ensuring long-term asset resilience.

3.2.4 Legislation and regulation recommendations

This report has not undertaken an in-depth review into all the legislative clauses and regulations effecting asset management, and has not made recommendations for any new specific legislation.

Transparency

1. Investigate where appropriate legislation, or regulatory disclosure could be introduced to improve transparency and consistent asset management for major infrastructure providers.

The non-regulated telecommunications, energy generation, gas production and fuel asset providers, plus other sectors such as retirement accommodation, are important for the well-being of New Zealanders, however there is little disclosure of their asset management practices, performance or plans. Based on key recommendation one, an asset management system lead could identify the disclosure requirements.

³⁴ [AG-4 The audit of performance reports.pdf — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](#)

3.3 Workforce

Note that this section described issues relating to the broader capability and capacity of the asset management workforce in New Zealand. The People section in section four looks at how major infrastructure providers manage capacity and capability within their organisations.

3.3.1 Overview of infrastructure workforce

Workforce capacity

New Zealand has tended to have a boom/bust cycle for infrastructure investment and delivery that has led to a lack of continuity in terms of workforce development. The infrastructure delivery workforce such as trades and project management has had more attention in the recent past, but asset management has not been considered. The current gaps in the asset management workforce are constraining asset management practice, improvement, and innovation.

Asset managers are required both within infrastructure owning organisations, and within major service delivery providers.

Training and qualifications

New Zealand has previously led the way in developing asset management practice and having an internationally recognised cohort of leaders in asset management practice and guidance.

Āpōpō (formerly known as IPWEA NZ), is the lead member association for infrastructure asset management professionals in New Zealand. The training suite that Āpōpō has started is innovative in terms of micro-credentials and bite-sized asset management badges. This is growing into an ecosystem but has been reliant on the industry body to develop and grow the course offering without outside investment. There are now sufficient courses but there hasn't been the throughput required to measurably increase asset management capability and capacity as an industry.

Industry guidance and training have helped to build capability in many sectors, with Āpōpō (infrastructure), EEA (electricity distribution) and RIMS (roads) providing training and guidelines for asset management in their sectors. Āpōpō provides a growing number of micro-credentials for specific asset management competency areas.

Infrastructure asset managers are often engineers but also come from finance, procurement, project management, planning and other disciplines. We are seeing more movement of asset management professionals between sectors, recognising that their core skills are transferrable. However, there is no formal accreditation or specific industry-qualification for asset management like there is for engineers, accountants, or project managers. There is no formal or established pathway into asset management.

Industry groups

The level of industry coordination and support has a positive relationship with the sectors' asset management maturity. In particular, the local government sector received international recognition as a forerunner in asset management practices in the early 2000s, largely due to the coordinated industry approach through IPWEA's NAMS Group, that developed the IIMM and other products and training support. The Electrical Engineers' Association (EEA) has provided many guidelines and frameworks, some in partnership with IPWEA, to support the development of sector asset management maturity. Roading Improvement Management System (RIMS) in the transport sector has been an effective means to leverage asset management practice over the last 15 years.

3.3.2 What does good look like for workforce?

The points below identify good examples of practice that has led to better asset management or outcomes.

- The asset management workforce has availability of people with the right skills and capabilities at decision-making, tactical and operational levels.
- Asset management recognised as a “specialist” profession with entrance points, qualifications (industry training, graduate, and post-graduate), and support to grow the workforce both from a capability and capacity perspective.
- Asset management needs to be identified as a profession and a career choice for school leavers or graduates and/or through a mid-career entry point. Asset management practice could be included more in other tertiary-level degrees such as engineering, finance, and management. A degree in asset management was trialled but was not eligible for Tertiary Education Commission funding so has not had sufficient take-up.
- Industry body and networks developing industry accreditation schemes that create a “profession” identity with consistent capability and assurance of expertise.
- Major infrastructure providers use asset management competency frameworks to identify and build capabilities in their workforce such as the NZTA Asset Management Competency Framework³⁵.

Te Ringa Maimoa Transport Excellence Partnership recognises that the sector must have the right teams of appropriately skilled and experienced staff to plan for and deliver great service to our customers.

The Waka Kotahi Asset Management Competency Framework (AMCF) helps individuals and organisations to measure their capability and supports them to make smart decisions regarding staff skills and workforce development.

The Āpōpō asset management badge training is aligned to this framework.

3.3.3 Workforce issues

- **There is no formal career pathway and qualification**, aligned with industry support, for people wanting to establish themselves as asset managers.
- **There is currently a significant lack of asset management expertise and there is no specific graduate pathway** for asset managers outside of private sector engineering firms. This has potentially led to positions not being filled, resulting in resources being re-prioritised away from asset management, or inexperienced asset managers are appointed and make insufficient progress.
- **There is no formal industry accreditation for asset managers** such as chartered engineer or accountant, and this reduces visibility of the profession with inconsistent standards of capability.

³⁵ [Asset Management Competency Framework | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](https://nzta.govt.nz/asset-management-competency-framework/)

- **There is currently little research on whether there are sufficient asset management resources in New Zealand.** There has been some improvement in economic forecasting of the construction and infrastructure sector workforce, but it is still high-level and doesn't appear to be providing sufficient people to both deliver infrastructure, and asset managers to manage the existing infrastructure.
- **Asset management is not widely known as a “discipline” or profession** and is not identified as a career pathway for school leavers/graduates, or for experienced infrastructure professionals.
- Industry groups such as Āpōpō, IPWEA and EEA have the existing audience and capability to deliver professional development, best practice, benchmarking, and assessment, however increased capacity will be necessary to significantly improve the current state of play.

Te ao Māori and Mātauranga Māori has an asset management body of knowledge that has, until very recently, been ignored by formal guidance such as the IIMM. Development of the Āpōpō Guide for asset management practitioners in Aotearoa is a first step at addressing this failing. The Āpōpō Guide, being developed by sector SMEs, seeks to integrate guidance on the best practices of both Te Tiriti o Waitangi partners while ensuring alignment with international standards and recognised principles.

3.3.4 Workforce recommendations

Productivity

1. **Key Recommendation 7: Invest in asset management training programmes and develop a clear training pathway for asset management professionals.**

Acknowledgement of training opportunities and more integration of industry training across the wider infrastructure workforce is required. Some specific funding to run asset management training and/or help maintain the industry-led training already developed would likely increase through-put.

2. **Forecast the likely demand, supply, and gaps in asset management workforce.**

Use economic infrastructure forecasts to identify workforce requirements for asset managers as well as infrastructure delivery. Ideally commission research specifically on the current level and best-practice asset management workforce.

3. **Develop an asset management workforce development plan.**

This should include career pathways, qualifications (industry and tertiary level training) and industry support including entry-level roles, mentoring and support. Currently there is a lack of asset management capacity, including younger people to continue to develop asset management and there are limited pathways to enter the profession. This recommendation will provide more certainty for industry to invest in skills and training of asset managers including funding for tertiary pathways.

4. **Promote asset management as a discipline with a career pathway and include explicitly with other infrastructure workforce initiatives.**

Acknowledgement of asset management as a function within overall infrastructure workforce forecasts and planning is required, as well as specific plans to increase the asset management workforce over the short to medium-term.

5. **Develop a national competency framework and mandate achievement of competency standards for key asset management professionals in major infrastructure providers.**

This would show there is serious intent to establish asset management as a profession to achieve the desired infrastructure outcomes. The existing NZTA Asset Management Competency Framework could be adapted or adopted.

6. Review and if necessary, establish asset management communities or industry groups both within and across sectors.

This will enable asset management practice to be shared across and between sectors. There are pockets of good practice, for example in the electricity sector and the RIMS practices in transport, that could benefit other sectors. Sharing ideas and leveraging work is crucial given the limited asset management resources in place now, and likely over the short to medium term.

4. State of play – asset management

4.1 Summary of maturity assessment results

4.1.1 Infrastructure system maturity

This study assessed the maturity of asset management practices across the infrastructure sectors, using the framework in the International Infrastructure Management Manual (IIMM). Figure 4-1 illustrates the results, with the sectors maturity results presented for twelve asset management functions (the maturity assessment process is included in section 2.6.3 and full scoring descriptors for each asset management function are included in appendix six). The colour shading below was applied to show the range for each sector but doesn't necessarily indicate full achievement of that maturity level. The pluses and minuses reflect a score at the upper or lower half of the range, respectively.

It is important to note that evidence to support asset management maturity was not readily available for most sectors, and we did not attempt to undertake organisational asset management maturity assessments where they did not exist. We drew from existing documented and publicly available information (e.g., information disclosed under regulation, published asset management plans, or annual reports), additional information that organisations were willing to share (e.g., their own maturity assessments), the writers' own knowledge of practice, and interviews with sector representatives.

Sector	Energy	Telcos	Water/Waste	Transport	Health	Community	Education	Other sectors
Strategic direction	+	-	-	-	-	-	+	-
Levels of service	-	-	-	+	+	-	-	+
Demand	+	-	-	+	+	-	-	+
Risk	+	+	-	-	-	-	-	+
Operational planning	-	+	-	-	-	-	-	-
Capital planning	-	+	-	-	-	-	-	-
Financial management	-	+	-	-	+	-	-	-
Asset management plans	+	-	-	+	-	+	-	-
Evidence	+	+	-	+	+	-	+	-
People	+	+	-	+	-	-	-	-
Service delivery	-	-	-	-	+	-	-	+
System and improvement	+	-	+	-	+	-	-	+
Overall	+	-	-	+	-	-	-	-

Figure 4-1: Asset management maturity across infrastructure sectors

Aware	At upper end of range, the organisation is aware of the need, but has not yet implemented, the process or practice
Basic	At upper end of range basic level processes and practices are in place
Core	At upper end of range well defined and clearly linked processes and practices are in place
Intermediate	At upper end of range well defined and clearly linked processes and practice are in place and well understood throughout the organisation
Advanced	At upper end of range integrated processes and practices use advanced techniques and are being continually improved to deliver optimum performance

Although there have been no formal comparisons of asset management maturity internationally, New Zealand is recognised as having good practices. Maturity across sectors ranges from "aware of the need for elements of asset management" to "an intermediate level of maturity that has well defined and clearly

linked processes". Within the sectors there are some organisations that have elements of advanced level asset management.

For further discussion of each of the 23 sub-sectors' asset management maturity, refer to appendix six and for discussion across each element of asset management refer to sections 4.2 - 4.13.

4.1.2 What does this mean?

A crucial point to understand about these results is that the appropriate level of maturity varies depending on the infrastructure service criticality and other factors. We would expect to see more advanced levels of maturity for critical infrastructure sectors, whereas the upper end of core practice might be appropriate for management of a small network of community facilities.

Where there is a gap between current and appropriate levels of maturity, the infrastructure provider may:

- Fail to deliver on its strategic priorities through its asset management programmes.
- Defer planned asset maintenance and investment in areas that result in higher long-term costs for the community.
- Deliver a programme that is not aligned to the whole community needs and willingness-to-pay.
- Fail to adequately plan for growth, resulting in reactive, sub-optimal decisions around increasing capacity, or new assets.
- Make sub-optimal decisions (spends unnecessary money) due to lack of good asset condition, performance, and cost information.
- Have unplanned asset failures.
- Not work collaboratively across functions, resulting in duplicated, unnecessary effort.
- Not make procurement decisions that provide the best outcomes in terms of performance and/or cost.
- Not manage its risks effectively, resulting in failure to achieve objectives and levels of service and/or budget over-spends.
- Have inefficient work practices because staff are not provided with effective tools.
- Not maintain or progress asset management improvements resulting in higher levels of risks described above.
- Have stressed staff and low levels of engagement arising from all the above.

Where infrastructure providers have appropriate asset management practice and sufficient funding, we would expect to see assets performing in-line with service levels and customer expectations over the short, medium, and long-term.

4.2 Strategy

4.2.1 What are we talking about and what is included?

Strategic organisational goals and customer and stakeholder priorities are analysed and aligned through a strategic asset management framework (asset management policy, strategic asset management plan, and asset management plans)

The organisation's strategic goals, customer requirements and external environment influence what activities the organisation does and how these are best delivered. Within this context, a strategic asset management framework should be developed that guides the organisation in terms of asset management priorities and strategies and sets out specific responsibilities, objectives, targets, and plans for asset management development.

The asset management policy supports an agency's strategic objectives and articulates the principles, requirements, and responsibilities for asset management (**what** asset management is expected). The strategic asset management plan sets out the objectives, practices and action plans for asset management improvement, audit, and review processes (**how** asset management is expected to be delivered).

The strategic asset management framework should provide the line of sight from organisational objectives to asset management and operational objectives, and:

- consider broader outcomes and link business units in an organisation together.
- Be developed collaboratively with consultation, engagement, and a team approach.
- Include Te Ao Māori, and Mātauranga Māori in strategy development to provide effective long-term management for infrastructure.
- Show the impact of a strategy shift on programmes of work.
- Be able to be used to support trade-offs in the decision-making process.

A good example of an organisational strategy that has clear outcomes is the Waka Kotahi Road to Zero Strategy.

The Government's Policy Statement for Transport is translated into programmes of work to deliver the strategic priorities and the benefits that will be achieved.

[Road-to-Zero-strategy_final.pdf \(transport.govt.nz\)](#)

A diagrammatic example of an asset management framework is included in Figure 4-2.

4.2.2 Strategy maturity

Key elements assessed in the asset management strategy function include:

- Strategic objectives are identified and prioritised for the organisation.
- Strategic issues and options have been analysed and prioritised.
- Customer and stakeholder requirements are analysed.

The asset management policy and asset management objectives are aligned to the above.

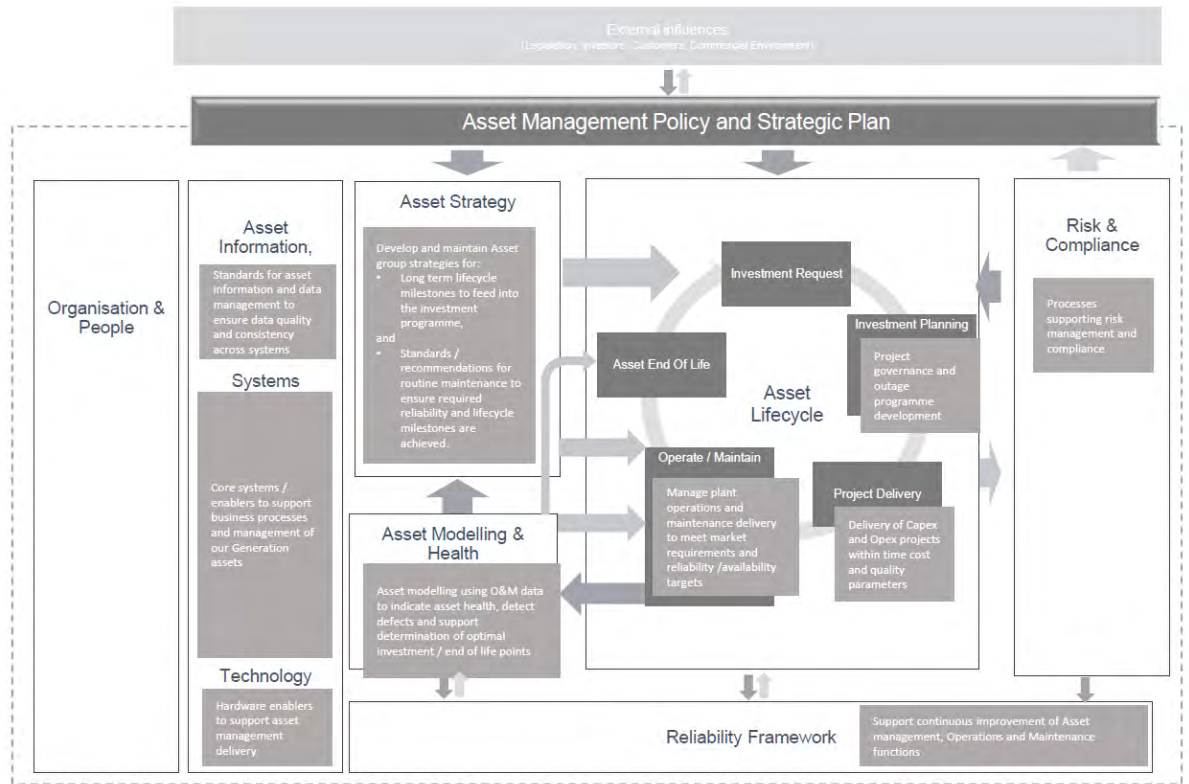


Figure 4-2: Example of an asset management framework (courtesy of Genesis)

The more mature sectors, shown in Figure 4-3, are the transport sector and the regulated sectors. These feature well defined outcomes and objectives.

The LGA sets the requirement for LTPs to consider community outcomes, and the Infrastructure Strategy to consider the strategic context and significant issues and principal options to resolve them. Regulation sets objectives for sectors such as Electricity and now Water who have Statements of Intent to document the strategic objectives.

Lower performing sectors still typically have strategic organisational objectives in place, but not a strategic asset management framework as described in the previous section (or may only have some components, such as an asset management Policy).

Many sectors suffer from an array of strategic planning documents that have their own set of objectives to achieve which makes consistent connection through the asset management suite of documents complicated. This is particularly so in the local and central government sectors.

Sector	Strategic Direction
Energy: Electricity	Green
Energy: Gas	Yellow
Energy: Fuel	Orange
Telecommunications	Yellow
Water and Waste: Three Waters	Yellow
Water and Waste: Solid Waste Management	Yellow
Water and Waste: Rivers/Flood Control	Orange
Water and Waste: Irrigation	Orange
Transport: Local Roads	Green
Transport: State Highways	Green
Transport: Rail	Yellow
Transport: Sea	Yellow
Transport: Air	Yellow
Health: Public Sector	Red
Health: Private Sector	Orange
Community: Social Housing	Yellow
Community: Community Buildings	Yellow
Community: Parks and Open Spaces	Yellow
Education: Primary and Secondary	Yellow
Education: Tertiary Education	Yellow
Other sectors: Justice	Orange
Other sectors: Defence	Green
Other sectors: Land and Forestry	Yellow

AM Maturity Scale



Figure 4-3: Strategy maturity

4.2.3 Strategy issues

The strategic planning horizon is not consistently long enough across all infrastructure sectors. Investment cycles in infrastructure can be very long and the current planning horizon is not sufficient to include significant build programmes and renewal profiles for long-life assets that may have a 50 or 100-year lifespan.

There is a lack of clarity in most sectors about what constitutes a strategy versus a plan. A strategy identifies your purpose and direction. A plan details how you execute that direction. In the local government sector, we see a 30-year Infrastructure Strategy within the LTP.

Often the organisation’s strategic planning function is undertaken with limited connection to the tactical planning (two to five-year horizon), operational planning, or service delivery aspects. This can mean the strategy is undeliverable. In addition, there is weak accountability and often no reporting on elements of strategy that have not been achieved.

Engagement in strategic plans is not always meaningful. Consultation is often seen as a compliance “tick box” exercise that must be done. This means that stakeholders do not feel listened to, and information from stakeholders is not used, or useful for decision-making.

Some organisational strategic frameworks are overly complex. Most sectors must respond to several different pieces of legislation that each has its own set of requirements. This is creating groups of strategy documents to respond to these directives against the range of strategic objectives, without transparent trade-offs or prioritisation.

There is more opportunity to build on the stewardship values in Te Ao Māori, Tikanga, or Mātauranga Māori in New Zealand’s strategic asset management approach.

4.2.4 Strategy recommendations

Transparency

- 1. Ensure that organisations strategic planning horizons are consistent with the expected lives of their assets.**

Long life assets need a long-term planning horizon to consider strategic improvement and renewal investment.

A strategy is not just a “budget with lots of explanatory words attached”

[Don't Let Strategy Become Planning \(hbr.org\)](http://hbr.org)

- 2. All major infrastructure providers should have a strategic asset management Framework (which typically includes an asset management policy and a Strategic Asset Management Plan), that is approved at a senior leadership or governance level, and should consider making these documents available on websites.**

Best practice requires that a policy and strategy document describe the strategic direction for asset management in an organisation, but these are not consistently produced or reviewed.

- 3. Improved guidance should be developed to simplify and clearly delineate what is expected from a strategy document as opposed to policies or plans.**

Often there is significant duplication across long documents that may not reflect the value in producing and maintaining the documents.

4.3 Levels of service

4.3.1 What are we talking about and what is included?

Levels of service (service outcomes) are established through level of service option analysis and engagement with customers. Performance is measured, analysed, and reported.

Levels of service are the cornerstone of good asset management and provide the platform for lifecycle decision-making. Levels of service are the means of defining the outcomes and outputs that customers can expect from asset-based activities.

Levels of service can provide the line of sight from strategic objectives or outcomes to the work done on the ground. Progress towards the desired levels of service should be monitored against appropriate performance measures, with targets set through effective options analysis comparing cost, service and risk.

A key step in the asset management planning process is to find out what levels of service customers are prepared to pay for, and the asset performance and capacity needed to deliver those levels of service. This should include stakeholder engagement to define service levels.

Organisations that use levels of service effectively demonstrate the following:

- Levels of service are used as the key decision-making tool for investment in infrastructure.
- Level of service options are developed for each significant level of service area, to clearly show what can be achieved for a given amount of investment and the resulting levels of service and risk.
- Align their performance measures with industry standards or initiatives, to support monitoring of performance across the sector.

4.3.2 Levels of service maturity

Key elements of levels of service that are assessed are:

- levels of service cover all important aspects of the service provided and are aligned to strategic outcomes.
- levels of service are set through level of service option analysis and engagement with customers.
- future asset performance targets are established for each level of service area, and performance is measured and reported against levels of service.

The Differential Level of Service Framework, produced by Te Ringa Maimoa, aims to provide better evidence for transport investment decision-makers and a consistent way of describing transport levels of service across the sector.

It aligns community outcomes through to performance measures, streamlines optioneering and provides a robust connection between service, cost, and risk.

[Differential Level of Service Framework](#)

The National Asset Management Steering Group (now a committee within Āpōpō) developed a Levels of Service Guideline with examples of good levels of service and performance measures across all local government sectors. It is now dated (2006) but is worth investing in to provide a consistent level of service framework for New Zealand's major infrastructure providers that supports a State of the Nations report (or similar).

The energy and transport sectors have made some good progress in this space and are operating at the intermediate level of maturity. Key aspects of this maturity include a strong performance reporting framework because price-quality regulation focusses attention on the cost (price) and level of service (quality) relationship.

Having funding linked to level of service delivery from a co-funder, like NZTA, provides a focus on level of service setting.

The water sector has largely used the DIA non-financial performance measures in the past but is moving to a national level of service framework in the 2024 asset management plans.

Central government agencies tend to have few levels of service that describe the performance of their infrastructure.

Levels of service have been a fundamental part of the long-term planning process for local government, but currently levels of service are not consistent across sectors or across local authorities.

4.3.3 Levels of service issues

Levels of service are not consistently defined within the sectors (outside of regulated sectors which have mandated performance measures) and are developed independently in each organisation. This makes national prioritisation of delivery difficult within sectors, and cross-sector trade-offs very difficult.

Connecting objectives to levels of service. Levels of service are often not connected directly enough to the infrastructure renewals and maintenance or to the strategic objectives, which makes it difficult to prove delivery of the strategic outcomes. The consequences of investment decisions on strategic objectives are therefore not easy to communicate or understand.

Connecting cost, service, and risk. Level of service options that consider cost and risk and achievement of strategic objectives are rarely provided to decision-makers, so that informed decisions can be made.

Consultation on levels of service with customers is completed by some organisations, particularly in the long-term plan process, but is often done at the end of the decision-making process, rather than in a timely fashion to influence investment decisions.

Sector	Levels of Service
Energy: Electricity	Intermediate
Energy: Gas	Core
Energy: Fuel	Core
Telecommunications	Intermediate
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Basic
Water and Waste: Irrigation	Basic
Transport: Local Roads	Intermediate
Transport: State Highways	Intermediate
Transport: Rail	Core
Transport: Sea	Basic
Transport: Air	Core
Health: Public Sector	Aware
Health: Private Sector	Aware
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Basic
Other sectors: Defence	Core
Other sectors: Land and Forestry	Basic

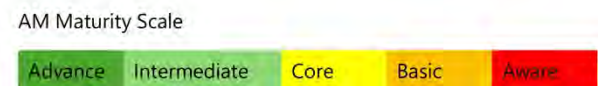


Figure 4-4: Asset levels of service maturity

Since 2012, the Australian Local Government Association has encouraged every local government in Australia to participate in a regular self-assessment survey of their infrastructure performance known as the National State of the Assets (NSoA) Report

[2021 National State of the Assets Report - Australian Local Government Association \(alga.com.au\)](https://www.alga.com.au/2021-national-state-of-the-assets-report)

National visibility of service levels. Information about the state of New Zealand’s assets is fragmented and inconsistent. The introduction of a “State of the Assets Report” in Australia has helped highlight the importance of investment in infrastructure.

4.3.4 Levels of service recommendations

Transparency

- **Key Recommendation 4: Require all public major infrastructure providers to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.**

A methodology like the Australian State of the Assets Report could be adopted in New Zealand.

Central government and Crown entities should be a priority to ensure there is a meaningful suite of asset and financial sustainability measures in place and publicly reported – the Australian National State of the Assets Report³⁶ is a good example as is the annual Infrastructure NSW State of Infrastructure Report³⁷. This is the type of information and data that we would expect to see in the Treasury 4-yearly Investment Statement. Over time we would expect good practice and broader measures. Financial sustainability measures could include the percentage of planned maintenance and the percentage of asset renewal of asset replacement values. The Australian Local Government experiences with financial sustainability measures provide learnings that should be considered for New Zealand. Te Waihangā has established online dashboards that presents available information on the performance of critical infrastructure sectors (energy, water, transport, and telecommunications)³⁸.

Productivity

- 2. Encourage all major infrastructure providers to undertake available training on developing levels of service.**

This will improve the capability of asset managers to develop and utilise levels of service, and improve decision-making, by focusing on community or customer needs.

Te Waihangā has established an online dashboard that presents available information on the performance of the critical infrastructure sectors. It’s a great start but is limited by the availability of data collected by each sector in a common format.

VKT PER LANE KILOMETRE OF THE LATEST FINANCIAL YEAR (2020/21)



(VKT is vehicle kilometres travelled)

³⁶ [2021 National State of the Assets Report - Australian Local Government Association \(alga.com.au\)](https://www.alga.com.au)

³⁷ [State of Infrastructure Report | Infrastructure NSW](https://www.infrastructure.nsw.gov.au)

³⁸ [Our work | Performance Monitoring | Te Waihangā](https://www.tewaihanga.govt.nz)

4.4 Demand planning and management

4.4.1 What are we talking about and what is included?

Future demand requirements and scenarios are analysed, and asset constraints are identified. Asset and non-asset solutions have been evaluated to match demand and supply.

Demand is a measure of how much customers consume the services provided by the assets. This asset management activity involves estimating demand for the service over the life of the asset management plan or the life of the asset.

The ability to predict demand enables organisations to plan and meet that demand, manage risks of not meeting demand, or investing in demand-management.

4.4.2 Demand maturity

For central government, there are no requirements to forecast or plan for changes in demand.

In the regulated sectors, information on demand and capacity planning is required. In the private sector, commercial incentives promote demand forecasting.

There are some good practices in sectors that have changeable demand conditions and where the consequences of failure to meet demand are high. Examples are defence, primary and secondary education, air transport, telecommunications, and electricity. Long project delivery timeframes can put more pressure on demand projections and means that un-forecasted demand may create significant infrastructure lags.

The poorer performing sectors are public health, justice, and land/forestry.

Sector	Demand
Energy: Electricity	Core
Energy: Gas	Core
Energy: Fuel	Core
Telecommunications	Intermediate
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Basic
Water and Waste: Irrigation	Basic
Transport: Local Roads	Core
Transport: State Highways	Core
Transport: Rail	Core
Transport: Sea	Core
Transport: Air	Intermediate
Health: Public Sector	Aware
Health: Private Sector	Core
Community: Social Housing	Basic
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Intermediate
Education: Tertiary Education	Core
Other sectors: Justice	Basic
Other sectors: Defence	Core
Other sectors: Land and Forestry	Basic

AM Maturity Scale



Figure 4-5: Demand maturity

4.4.3 Demand issues

Planning for uncertainty. The future is inherently uncertain, yet infrastructure demand forecasts are predominantly based on an average population growth forecast. A better response is to build robustness to uncertainty by creating demand forecasts as a range of likely scenarios, and then using those forecasts to create flexible asset management practices that can succeed under a range of outcomes.

Response to demand changes. The response to growth pressures is not always managed well and often leads to poor resilience outcomes. For example, developers may need to build sufficient flood protection assets for a minimum 1 in 100 years flood within a specific development, but not around the margins of the development. In the more fast-growing areas such as Queenstown and Auckland, there are numerous examples of developers being permitted to build new housing ahead of the infrastructure, leading to under capacity assets and performance issues.

Most major infrastructure providers reference or include population forecasts in their asset management plans, but then fail to convert that growth or decline into meaningful impacts on their assets or future investments. Some activities use a provision ratio (such as one park per 10,000 people, or within one kilometre), which is useful for comparison.

Central government organisations are not required to show population projections or their response to increases or decreases. The health sector has seen both increase in population and pressure from increasing admissions, but there has been no new hospital site built outside of the Christchurch rebuild. The sector has had known demand but there has been little response in the form of additional investment in primary care, to enable demand management for hospital beds.

Regional planning. New Zealand’s Infrastructure Strategy shows the national pipeline of investment over the next 30 years. Organisations are mostly planning response to growth independently, but there needs to be a more integrated view. Location master-planning by territorial authorities may not fully consider central government services such as schools, hospitals and police stations that have a significant impact on the wellbeing and success of communities. This is subject of the separate report from Te

The LGA requires territorial authorities to collect development contribution funding; they must identify the growth-related portion of capital expenditure required to meet demand. Long-term plan auditors can examine whether capital forecasts are in line with demand projections.

Wellington City Council’s approach to dealing with uncertain levels of sea level rise is to build sea walls with a stronger base than is required for the current wall height. That enables a taller wall to be built in future if it is ultimately needed.

Another example is designing a bridge so that additional lanes could be added in future, or traffic lanes could be changed to be used by bus or rail instead.

The Singapore Masterplan is recognised in the industry as a good example of demand forecasts being translated into outcomes and projects that are mapped spatially. This makes it easily understood by the public and all stakeholders.

<https://www.ura.gov.sg/Corporate/Planning/Master-Plan>

Waihangā, that identifies advance site protection can be beneficial and that a “wait and see” approach often means needed infrastructure doesn’t get built³⁹.

Non-asset (demand management) solutions. The optimal response to changes in demand is not always to build more assets. The consideration of alternative forms of managing demand is often part of a robust business case. However, many organisations are not considering options to meet demand other than new provision of assets. In the public health and Justice sectors, actions such as prevention or primary care intervention may be indicated in strategies, but the demand management activities often are not invested in or achieved.

There has been modelling done in the transport sector on the impact of various congestion charging mechanisms as a means of demand management to replace or supplement additional road building.

4.4.4 Demand planning and management recommendations

Productivity

1. Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.

There is little requirement in New Zealand for major infrastructure providers to co-ordinate planned responses to changes in demand. In the more fast-growing areas such as Queenstown and Auckland, there are numerous examples of developers being permitted to build new housing ahead of the infrastructure, leading to under capacity assets and performance issues. While there are generally long-term infrastructure plans for councils (30-year time horizon) these may not be sufficiently integrated with networked infrastructure providers or central government services. Current land-use and planning settings may hamper effective spatial planning and delivery of services to communities⁴⁰.

2. Encourage infrastructure providers to disclose planned asset and non-asset responses to changes in demand.

Disclosure of responses will ensure that adequate provision is being made for changes in future demand. The responses can be additional asset capacity or may be alternatives such as pricing or water conservation advertising.

³⁹ [Protecting land for infrastructure: How to make good decisions when we aren’t certain about the future | Te Waihangā](#)

⁴⁰ [Protecting land for infrastructure: How to make good decisions when we aren’t certain about the future | Te Waihangā](#)

4.5 Risk and resilience

4.5.1 What are we talking about and what is included?

Risk and resilience levels are analysed at strategic-operational-asset levels. Risk management mitigations are identified, prioritised and are incorporated into asset management plans. Asset risk and criticality has been assessed and is used in lifecycle planning.

Resilient infrastructure absorbs and adapts to disruptive events to enable rapid recovery and is an important facet of resilient communities. A risk management process identifies, evaluates, and prioritises risks and identifies mitigations for the higher risks. The outcome of a rigorous risk management process, if mitigations are undertaken, should be more resilient infrastructure.

The 'risk and resilience' function interacts with all parts of the asset management system. Capital and operational expenditure on risk mitigations aims to reduce risk exposure and increase level of service (risk-cost-performance trade-offs). Demand planning requires consideration of the risk of failing to meet future demand.

4.5.2 Risk and resilience maturity

The maturity assessment for *risk and resilience* considers whether:

- Risk management is built into all levels of the organisation – strategic-operational-asset levels (e.g., strategic risk frameworks and registers, operational business continuity plans, critical asset contingency plans).
- Asset-related risk mitigations are identified, prioritised and are incorporated into financial forecasts and asset management plans.
- Resilience is assessed for both the physical networks and the organisation itself, including consideration of risks arising from interdependencies with other major infrastructure providers, and improvements identified and managed.
- Asset risk and criticality has been assessed and is used in lifecycle planning (e.g., planned maintenance programmes targeted at critical assets, high risk assets prioritised for renewal).

Risk management practices occur across all infrastructure sectors. Risk registers are commonly managed within a corporate framework, though the extent to which these are actively monitored and used to drive investment in mitigations varies significantly.

Sector	Risk
Energy: Electricity	Core
Energy: Gas	Core
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Core
Transport: Local Roads	Core
Transport: State Highways	Core
Transport: Rail	Core
Transport: Sea	Core
Transport: Air	Core
Health: Public Sector	Core
Health: Private Sector	Core
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Core
Other sectors: Defence	Core
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-6: Risk and resilience maturity

The higher rating sectors – airports, ports, energy (fuel, gas, electricity) and telecommunications – have either:

- strong competitive and commercial drivers to maintain reliability (telecommunication, ports, airports) and/or
- regulatory drivers, such as Civil Aviation Authority regulation for air transport and risk information required in the information disclosures for organisations under economic regulation.

The sectors most directly involved in lifelines (water, telecommunications, transport, and energy) have legislated imperatives under the Civil Defence and Emergency Management (CDEM) Act 2002 to continue to function in an emergency (to the maximum practical extent). This is a particular driver for the telecommunications and liquid fuel sectors, which are not wholly covered under the regulations described (Chorus and fibre companies are - for more details refer Appendix six). Through this legislation, lifelines organisations are all involved (though to varying extents) in CDEM and Lifelines Group planning and coordination within the sector to better manage interdependencies.

4.5.3 Risk and resilience issues

Investment in infrastructure resilience often fails to get prioritised, despite demonstrable need. The case for change has been widely investigated and articulated through climate change planning, national disaster planning, regional lifelines vulnerability assessments, lifelines infrastructure organisations' resilience work, and much more. Yet mitigation projects often fail to make their way into asset management and funding plans:

- because they do not meet benefit-cost thresholds under regulator/funder settings (energy, telecommunications, transport) – broader interdependency and social benefits are not part of the funding methodology. The risk-cost models used are not working.
- because they fail to get prioritised in highly constrained funding settings with multiple competing needs (local and central government).
- until after the disaster, when the mitigation works end up being at a much higher cost.

To drive investment in infrastructure resilience in advance of disruption, DPMC are developing options to enhance the resilience of Aotearoa New Zealand's critical infrastructure. Central to the proposals is the requirement for critical infrastructure entities to develop, implement and maintain a risk management programme, which includes undertaking a criticality assessment to determine critical components, determining material risks to critical components, and taking reasonably practical steps to mitigate those risks.

Lifelines Engineering' is an informal, regionally-based collaboration that provides a framework to support integration of asset management, risk management, business continuity management and emergency management by Utilities. The emphasis is on pre-event planning. Lifelines Groups are voluntary and are established in most regions of New Zealand.

New Zealand's infrastructure resilience issues were most recently exposed in the weather events of early 2023 but have been long highlighted through the Aotearoa-New Zealand Critical Infrastructure Vulnerability Assessment.

[NZ Lifelines - Home](#)

Cyclone Gabrielle and the Auckland floods had devastating impacts in 2023. System interdependences caused cascading failures: electricity failure causing wastewater overflows and telecommunications outages which caused subsequent disruption to other services such as electronic financial payments. Response and recovery efforts were hindered by restricted road access to fix sites including leaving some communities isolated for extended periods. Reacting to events is more costly and less effective than adapting critical infrastructure to be more resilient. The World Bank has recently identified that investment in resilience delivers benefits in 96% of scenarios, and the median scenario benefit is a four to one benefit/cost payoff - \$4 benefit compared to \$1 invested⁴¹. Climate change on average “doubles” the benefit i.e., \$8 benefit to \$1 invested, yet we know New Zealand is not prioritising investment in resilience and is stuck in a cycle of reacting to specific events when they occur. Closer to home it is estimated that the \$2 million invested to increase the Taradale stop-banks in Napier may have averted \$2 billion in damage and almost certainly more lives in Cyclone Gabriel⁴².

Risk and resilience assessments aren’t adequately informing asset management planning and investment. Most major infrastructure providers feature components of a good risk management system: e.g., Risk and Audit Committees, corporate risk frameworks and reporting, individual activity risk management registers and processes, and project risk management processes. However, in the lower performing sectors, risk management practices aren’t adequately informing asset management planning and investment because:

- There is limited governance attention, other than perhaps the top strategic/corporate risks reported to a risk committee or executive.
- Mitigations/treatment actions are generally not well monitored and lower-level project and asset risk registers and processes are often not well aligned and integrated, meaning the associated mitigations often don’t get actions.

Asset criticality frameworks are often developed, then not implemented, or used. This means that asset criticality frameworks often don’t result in an asset criticality rating in the asset register and then in asset planning and decision-making (and therefore doesn’t result in risk exposure and resilience improvements).

Some organisations do not have an owner of the risk and resilience function, and there is no clear champion of resilience to progress mitigation work identified through various local, regional, and national assessments into each organisation.

Risk-cost-level of service relationships are often difficult to define and discuss with governing and executive bodies, let alone with customers themselves. This means decision-makers aren’t well informed to make good decisions on risk appetite or tolerance.

There is limited transparency on infrastructure resilience standards for most infrastructure providers. Transpower provides an example of good practice by stating its design standards for some major hazards. Transpower designs its new substation assets for a 1:2500-year seismic event and a 1:450-year flood hazard since 2001. Transpower is updating the flood standard to include climate change.

⁴¹ Hallegatte,Stéphane; Maruyama Rentschler,Jun Erik; Rozenberg,Julie. *Lifelines : The Resilient Infrastructure Opportunity (French)*. Sustainable Infrastructure Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/821871561014920854/Lifelines-The-Resilient-Infrastructure-Opportunity>, page 2-3

⁴² Presentation from New Zealand Lifelines Forum in October 2023

As an example, many major infrastructure providers use 1:100-year planning for flooding events, and much longer return period events for geological hazards. For the most critical infrastructure, there needs to be better understanding of risk exposure and consequences to these hazards (not just natural hazards, but also threats such as cyber-attacks).

Some infrastructure providers are not good partners in collective resilience initiatives.

Representation at lifelines and disaster planning sessions is often not senior enough; information and actions don't get 'taken back' into the organisation for consideration and further development. Information is available to support vulnerability assessments, but it is not always easily accessible or useable.

There is limited transparency on the risk levels New Zealand is carrying in terms of infrastructure, particularly for "users" who are often the eventual funders of infrastructure. Are consumers and the government aware of the infrastructure risk either in local communities or across Aotearoa? Is infrastructure risk reported consistently and transparently across sectors? Who decides on the resilience levels and whether resilience investment should be in utilities or health?

There is no cross-sector prioritisation of national resilience investment, with consideration of interdependencies. Therefore, funding may be being spent in one sector, but would have a bigger overall effect on New Zealand's resilience if it was spent in another.

Further:

- There is no centralised government owner of infrastructure resilience, though DPMC holds the National Risk Register which includes risks to critical infrastructure (this is publicly available⁴³).
- The NZ Lifelines Council facilitates cross-sector infrastructure resilience discussions at a national level, but activity is limited by funding and lifelines work is not widely recognised at government, board and executive levels.
- A regional earthquake infrastructure mitigation business case was developed by the Wellington Lifelines Group, but it has had limited influence on major infrastructure providers that didn't already have those projects in their asset management plans.

Limited consistency or transparency on insurance coverage. Most central government agencies have been

DPMC's critical infrastructure resilience programme aims to embed good risk management practices in Aotearoa New Zealand's most critical infrastructure entities – those that if disrupted would have regional or national consequences. Requirements will apply equally to all critical infrastructure entities, meaning that collectively they will address the dependencies across the critical infrastructure system, which can lead to cascading outages, such as those experienced as a result of the North Island Severe Weather Events in 2022-23.

The EEA has done some great work to support its members to prepare their networks and their organisations and respond better to disruptions of any kind, through the preparation of a Resilience Guide and a Risk Management Maturity Assessment Tool.

[Electricity Engineers' Association: Resilience Guide 2020: Resilient Organisations \(resorgs.org.nz\)](#)

⁴³ [New Zealand's National Risks | Department of the Prime Minister and Cabinet \(DPMC\)](#)

incentivised to self-insure as a cost-efficiency measure, but this may mean there is a significant unquantified fiscal risk. There were attempts by MBIE to review and establish consistent insurance arrangements and contracts, but this did not progress. The self-insurance model means there is limited incentives to invest in resilience, given that central government has mostly fully-funded damage and recovery from extreme events.

4.5.4 Risk and resilience recommendations

There is work already underway by government on infrastructure resilience. With that in mind, the recommendations are largely in support of progressing with this work.

Resilience

- 1. Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other major infrastructure providers should be encouraged to meet this requirement.**

There are no national standards or requirements for the resilience of critical infrastructure (apart from those buried in design codes and standards) and infrastructure providers are grappling with how to meaningfully engage with communities to discuss acceptable levels of risk and resilience.

New Zealand has a long history of underinvesting in resilience and overinvesting in recovery. Central government has funded recovery costs after major events, further reducing the incentive for infrastructure service providers to invest in their own resilience.

Work is underway across government to improve risk reduction, resilience and recovery settings, and we are supportive of these reforms. We believe there would be benefit in a national plan to prioritise investment in resilience, considering all appropriate funding avenues, to benefit all New Zealanders.

- 2. Support the work of regional lifelines groups to identify and manage interdependencies as part of regional critical infrastructure vulnerability assessments.**

There is currently no funding for regional vulnerability business cases to seek investment in infrastructure resilience, that is likely to have community and economic benefits. Part of the problem is believed to be that the central government has funded recovery costs after major events, so there is less incentive for specific organisations to invest in resilience. There may be benefit in a national plan to prioritise investment in resilience, to benefit all New Zealanders. As identified there a clear economic and wellbeing cost/benefit advantage in investing in resilience at a national level.

- 3. Support the work already underway by government on infrastructure resilience, with increased legislative requirements through critical infrastructure resilience reform.**

DPMC is leading work to develop a set of proposals (in line with OECD leading practice and consistent with reforms Australia completed in 2021) for public consultation. These aim to embed a consistent approach to asset and risk management across our critical infrastructure system, so that it is more resilient to an increasingly complex set of hazards and threats.

To support critical infrastructure entities to better plan for and manage risks, options would also seek to improve information sharing within and between government and critical infrastructure entities to create a shared understanding of hazards, threats, and mitigations, as well as provide back stop powers for government to support entities to respond to the most significant national security events.

4. Prepare guidelines for infrastructure providers to support the implementation of good practice, including approaches to criticality assessment, risk assessment, and business continuity planning, and how these inform investment programmes and asset management plans.

As discussed in this section, there are many gaps in risk and resilience planning, and identified mitigations often don't find their way into asset management plans. The proposals in the critical infrastructure resilience programme provide an opportunity for critical infrastructure entities to take a strategic and coordinated approach to investment in resilience, and the recommended guidelines will help this be done in a practical, coordinated way that feeds into asset management investment planning.

The approach being developed through the critical infrastructure resilience programme aims to allow for an industry-led approach to resilience, with better asset-management at its core. This recognises that critical infrastructure entities (not government) are best placed to identify and manage their own risks. The proposed regime would be indifferent as to whether asset owners achieve additional resilience through asset hardening ahead of events or ensuring that services can be quickly restored after an event.

4.6 Operational planning

4.6.1 What are we talking about and what is included?

Operational (including maintenance) plans are designed to deliver maximum value. Incident and emergency management arrangements are in place, regularly tested and reviewed.

Effective operational strategies can mitigate risk, defer the need for asset renewals and minimise service downtime following asset failures. Planning for business continuity and full utilisation of assets are key factors in good asset management processes.

Planned maintenance scheduling allows for efficient resource deployment and actual costs and performance quality can be compared to the planned tasks. It provides a reliable basis for assessing deferred maintenance. In contrast, reactive maintenance may be unavoidable, has high transactional costs, and can be demotivating for frontline staff to do the same repairs repeatedly. In high performing organisations the overall maintenance spend is optimised where there is a focus on planned maintenance.

4.6.2 Operational planning maturity

Figure 4-7 presents the maturity for operational planning across the sectors.

Higher maturity levels in the regulated sectors are appropriate, considering the higher level of asset criticality and risk. Regulation requires disclosure of contingency planning and maintenance programmes. Reliability-centred maintenance practices are in place.

In the lower performing sectors, operational planning is typically based on historic practices and reactive maintenance is higher without a good, planned maintenance regime in place.

4.6.3 Operational planning issues

Incident and emergency management plans are widely in place for critical infrastructure sectors, and are usually reviewed after significant events such as COVID-19 and Cyclone Gabrielle. However, the extent of plan reviews and exercises is considered poor in many areas. Cyclone Gabrielle and other responses have exposed these gaps.

Sector	Operational Planning
Energy: Electricity	Core
Energy: Gas	Core
Energy: Fuel	Intermediate
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Basic
Water and Waste: Irrigation	Basic
Transport: Local Roads	Intermediate
Transport: State Highways	Intermediate
Transport: Rail	Intermediate
Transport: Sea	Core
Transport: Air	Intermediate
Health: Public Sector	Aware
Health: Private Sector	Basic
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Basic
Other sectors: Justice	Core
Other sectors: Defence	Core
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-7 Operational planning maturity

Lack of delineation between planned maintenance and unplanned maintenance.

Often actual expenditure and budgets are not split into planned (or periodic) maintenance and unplanned (reactive maintenance). The optimal balance between planned and unplanned maintenance is difficult to establish but is at the heart of good asset management.

A tendency for the asset management effort to focus on where the budget allows.

Operational and maintenance expenditure is mostly funded by rates or user charges, and there is unwillingness to increase user charges to meet maintenance needs. There is often, politically, a desire for capital expenditure on new projects but capital renewal does not appear as compelling.

Short-term siloed thinking. Organisations naturally think of what's immediately in front of them, but long-term lifecycle thought processes can be overlooked. Is the organisation thinking about how the current strategies could impact on assets in the medium or long-term? We should see integrated long-term life cycle approaches. Often asset management plans refer to sweating the asset, which may appear as a considered approach, but often is a hope that the asset will not fail.

Run to fail. A run to fail asset management practice may be appropriate for non-critical assets, but there should be management processes associated with this, such as adequate supply chain provision of spare parts, and service levels transparently identifying targeted asset failures.

Bottom-up asset lifecycle processes trumped by funding pressures. We frequently see that a considered, rigorous process to arrive at asset life cycle interventions, via asset management plans, is overturned by funding, political and budgetary decisions. The evidential picture built up through the asset management plans is often overtaken by political and funding concerns. A key area of improvement in asset management are procedures to help effectively manage decisions around the funding gap.

“The footpath to hell is paved with good intentions”

In the past few years many local authorities have been replacing their traditional concrete and asphalt footpaths in CBDs with paving stones. Councils are aware that the initial costs of pavers are higher than the older style footpaths but want to provide a smarter, welcoming appearance to shopping and business precincts. What many Councils have overlooked, however, is the increase needed in the maintenance and depreciation budgets due to:

- *Shorter asset lives of pavers (typically 15- 20 years) compared to 25-50 years for traditional footpath types*
 - *Increased transactional costs for replacement of broken pavers*
 - *More intensive, and expensive cleaning regimes.*
-

4.6.4 Operational planning recommendations

Transparency

- 1. All major infrastructure providers should report on the level of deferred maintenance and renewal as part of the consistent set of asset performance measures (refer to Key Recommendation 4).**

Deferred maintenance is reported in other jurisdictions and is defined as maintenance that is not performed when it should have been, or was scheduled to be, and which is put off or delayed for a future period. Deferred maintenance may shorten the asset useful life or reduce the service level of the asset. Adoption of this recommendation will provide reliable financial information at an organisation level and would provide a more robust basis for assessing the level of deferred maintenance. More advanced asset management data is required to deliver on this recommendation.

Productivity

- 2. Infrastructure providers should capture and report on planned and unplanned maintenance. All planned maintenance tasks are recommended to be:**

- Costed, and specify how the planned maintenance tasks are to be performed
- Compared to actual financial costs
- Compared to non-financial performance measures.

Infrastructure providers need to assess the optimal balance between planned and unplanned maintenance and regularly report progress against the target.

Resilience

- 3. Emergency planning requirements for critical infrastructure providers should be identified by a relevant system lead.**

The requirements for lifeline utility planning in the CDEM Act 2002 have never been monitored or enforced.

The recommendations relating to risk and resilience are also relevant here (supporting the critical infrastructure resilience reforms). In particular, the proposed requirements for critical infrastructure entities to develop, implement and maintain a risk management programme is strongly supported.

4.7 Capital planning

4.7.1 What are we talking about and what is included?

Effective decision-making frameworks are in place to evaluate the best value options and prioritise projects and programmes. Robust capital project and pipeline management processes are in place.

Capital investment includes the upgrade, creation, or purchase of new assets, typically to address growth or changes in levels of service requirements, or for the periodic renewal of existing assets, to maintain service levels.

Capital planning is a fundamental aspect of infrastructure management. Ideally it should take a long-term holistic view of the full range of asset management activities and bring together the different parties and disciplines – customers, funders, asset managers, finance, executive management, and political decision-makers. The decision on whether to create a new asset is typically the time when there is the most opportunity to impact on the potential cost and level of service.

4.7.2 Capital planning maturity

Capital planning has a higher level of asset management maturity compared to other elements. There has been a strong focus on business cases and local government has had to publicly disclose their capital projects in LTPs.

Cabinet expects all capital-intensive agencies to disclose 10-year capital intentions and make appropriate use of the better business cases methodology for programmes and individual investment proposals.

Central government capital plans vary in timeframe from one to four, to ten years, but are not required to be published.

Local government have ten-year LTPs and 30-year capital estimates in the Infrastructure Strategies. These are updated every three years. In practice, year one-three plans are funded, years four-ten are less certain and years 11-30 are more speculative.

Our observation is that business cases are less convincing for renewal of existing assets and are better used for new investment or significant transformation activities. Business cases work better if there is an asset management plan in place that articulates the case for change and investment. A business case is the appropriate artefact to evaluate the options for achieving the change.

Sector	Capital Planning
Energy: Electricity	Advance
Energy: Gas	Advance
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Core
Transport: Local Roads	Advance
Transport: State Highways	Advance
Transport: Rail	Advance
Transport: Sea	Core
Transport: Air	Advance
Health: Public Sector	Aware
Health: Private Sector	Core
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Core
Other sectors: Defence	Advance
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-8: Capital planning maturity

The public health sector has a low level of maturity. Health New Zealand identified that it would develop an investment prioritisation framework by December 2023, indicating that one did not exist previously.

The transport and electricity sectors generally have intermediate levels of maturity, with a strong focus on capital investment.

4.7.3 Capital planning issues

There is no consistent requirement for long-term capital investment plans across the infrastructure spectrum. There is a lack of transparency of capital investment plans for departments and Crown entities, as these are not required to be published.

Funding uncertainty for capital programmes. Funding is often not able to be secured for long-term capital programmes of work, due to the short-term nature of confirmed funding allocations. Local Government funding is secured in three-year blocks. Central government funding is typically secured annually if external budget funding is required and has a four-year budget horizon.

Political priorities overtaking long-term plans. Long-term investment plans can be derailed by changing political priorities. The election cycle, at three years, is usually not aligned to the planning cycle required for local or central government infrastructure.

Estimate optimism. Cost estimates of capital projects are often less than the final cost of the completed project. This is in part due to an optimism bias, which leads cost estimators to not allow enough contingency in terms of time or cost, under-estimation to secure initial project approval, as well as inconsistent inflation assumptions.

Business case development. Business cases for capital investment currently look to secure the funding for the initial capital investment, but do not often secure the funding for the ongoing lifecycle costs of operations and maintenance or renewal. The lifecycle costs are typically funded through a different business case process, if at all. There is often a lack of reference or alignment between the content of Business Cases and long-term asset management issues.

Cross-infrastructure project prioritisation. Where prioritisation processes exist for capital projects, they are often only within an activity, such as local transport, with little prioritisation across the organisation or sector, to consider whether funds may be better invested in a capital project in a different activity such as water or buildings.

4.7.4 Capital planning recommendations

Productivity

1. **Use the planned Te Waihanga National Infrastructure Plan to develop a longer-term view of planned infrastructure investments.**

The published Te Waihanga pipeline is focused on more certain and funded projects, but this could be complemented by a longer-term spatial planning view of project intentions across sectors. This could enable appropriate project initiation, funding, and alignment for complementary (such as a spatial plan for new schools and hospitals in significant growth areas) and dependant (such as horizontal infrastructure in significant growth areas) investments.

2. **All major infrastructure providers should provide evidence of effective asset management practices to obtain any new capital expenditure.**

Capital investment decisions are not always appropriately informed by asset management planning and practice, which could result in sub-optimal investment outcomes. The attestation requirements introduced in CO(23)9 and asset management plans can be used to support capital funding requests.

- 3. All major infrastructure providers need to ensure that business cases for projects include the funding request for the ongoing asset care and whole of life costing of the project, and are linked to asset management plans.**

Business cases currently focus on the capital cost, and often ignore the ongoing lifecycle costs of investments including the operation, maintenance, and renewal of assets, resulting in budget overspend and/or under-performance.

4.8 Financial management

4.8.1 What are we talking about and what is included?

Long-term financial forecasts are in place, based on whole-of-life asset costs, and funding strategies are developed. There is a reliable knowledge of asset costs, value, and depreciation.

Poor financial management can lead to higher life-cycle costs, inequitable fees and charges, and financial shocks. Good collaboration between financial and asset managers is important, especially in relation to long-term financial forecasts and asset revaluations. Asset valuation is required by international accounting standards and can be used in lifecycle decision-making. Robust financial budgets are a key output of asset management planning. The IIMM defines key principles for good financial management of infrastructure assets.

Funding for infrastructure spending comes from a wide range of revenue sources including user fees and charges, rates and levies, subsidies and grants, developer contributions, asset sales, capital injections from the Crown, internal organisational reserves, and external borrowing. A key emerging issue is inter-generational equity, given the long-life of infrastructure assets that often provide services over generations, but may have lumpy renewal profiles. In New Zealand, a substantial proportion of horizontal (water, roading, telecommunications and energy) and vertical infrastructure (schools, hospitals, social housing) was put in place post-second world war through to the 1960s. These are now at or close to the end of their useful lives. Debt funding is a means to spread the cost of infrastructure more equitably, but provisioning financial reserves through the life of assets should be considered. Many of our local councils have increased their debt to a point where they are reaching their debt ceilings. From 2009 to 2022, inflation-adjusted local government debt grew 226%, but inflation-adjusted rate revenues increased only 42%.

4.8.2 Financial management maturity

Key elements of the financial management element include:

- Financial data is a pivotal foundation to infrastructure management and planning and combined with asset attribute data gives a complete picture of asset profiles.
- Analysis and interpretation of the financial data occurs at a project, network, and organisational level.
- There is a reliable knowledge of asset costs, value, and depreciation.
- Clear funding policies are articulated, consulted upon and publicly available.
- Funding needs are forecast at least 10 years forward.
- Intended funding sources are relevant and appropriate to the asset activities requiring funding.
- Risks and uncertainties in obtaining funding are stated.
- There are mechanisms to manage any potential funding gap.

Sector	Financial Management
Energy: Electricity	Green
Energy: Gas	Green
Energy: Fuel	Yellow
Telecommunications	Yellow
Water and Waste: Three Waters	Yellow
Water and Waste: Solid Waste Management	Yellow
Water and Waste: Rivers/Flood Control	Orange
Water and Waste: Irrigation	Orange
Transport: Local Roads	Green
Transport: State Highways	Green
Transport: Rail	Green
Transport: Sea	Orange
Transport: Air	Yellow
Health: Public Sector	Red
Health: Private Sector	Yellow
Community: Social Housing	Orange
Community: Community Buildings	Yellow
Community: Parks and Open Spaces	Yellow
Education: Primary and Secondary	Yellow
Education: Tertiary Education	Orange
Other sectors: Justice	Yellow
Other sectors: Defence	Green
Other sectors: Land and Forestry	Yellow

AM Maturity Scale



Figure 4-9: Financial management maturity

Almost all major infrastructure providers in New Zealand are subject to International Financial Reporting Standards which mean that they adopt accrual accounting in their annual financial statements and apply the standards for asset values, depreciation, and the split between operating and capital expenditure. There is a marked difference in the degree of maturity of financial information depending on organisation types as follows:

- Central government departments and agencies are subject to the PFA. While this provides the framework for financial reporting in a broad way, it does not give effect to needed granular information from an asset management perspective.
- Local government agencies are subject to the LGA, which, in progressive amendments, has mandated Councils to prepare 10-year forward financial plans, 30-year infrastructure strategies and greater detail around expenditure classifications and funding rationale.
- Regulated sectors (e.g., electricity) where regulators require specific financial information disclosures and policies to support pricing of services.

4.8.3 Financial management issues

Lack of funding for infrastructure. One of the greatest challenges for most major infrastructure providers is to identify and source sufficient funding for all aspects of asset management. This includes present and future operational and maintenance expenditure, renewal expenditure and new capital expenditure. In the Te Waihangā report on New Zealand’s infrastructure challenge, and repeated in the 2023 Budget, it was estimated that New Zealand has a public infrastructure deficit of approximately \$104 billion at 2020, and that is expected to increase to around \$210 billion by 2030⁴⁴.

Funders or co-funders can incentivise organisations to improve asset management. For example, to obtain funding for roading and public transport infrastructure from NZTA, road control authorities such as Councils are required to prepare transportation asset management plans, apply cost benefit analysis, and submit justification for proposed funding. These are reviewed and rated by NZTA and funding subsidies could be affected if the plans and submissions are not up to standard. In addition, NZTA, through the Ringa Maimoa partnership provides tools for local authority transport asset management. This could be a model for other funders of asset expenditure.

The IIMM lists funding principles and strategies which are applicable for all asset-intensive organisations. These high-level principles are:

Transparency – consultation and communication with stakeholders that decisions on funding mechanisms are fair and considered and take account of intergenerational equity.

Legal compliance - the funding strategy should be congruent with any overarching financial prudence policies of the organisation.

Funding mechanisms are practical and easy to administer.

Funding strategies are forecast well into the future.

Funding needs are prioritised – for example, where there are budget constraints, that funding maintenance of existing assets takes priority over funding new projects.

Stating the extent to which the asset depreciation expense is funded, with rationale for the extent of the funding and an indication of how that funding is to be applied.

⁴⁴ [new-zealands-infrastructure-challenge-quantifying-the-gap.pdf \(tewaihangagovt.nz\)](https://www.tewaihangagovt.nz/new-zealands-infrastructure-challenge-quantifying-the-gap.pdf)

Asset valuations and asset consumption (depreciation) are not always updated with sufficient regularity. Often the time intervals between valuations are too long at 3-5 years. The volatility of price changes, and supply chain difficulties suggest the need for more frequent valuations. To obtain the best estimate of annual depreciation asset revaluations should be regular and use the “depreciated replacement cost” methodology where there is no market evidence. Some organisations do not continue to value fully depreciated assets, even though the assets may be still providing service.

Organisations apply different valuation methodologies depending on the sector, financial reporting requirements and regulatory requirements. The depreciated replacement cost valuation methodology is most closely aligned to asset management good practice, as it recognises the up-to-date replacement cost of assets, the extent to which they are through their life, and provides the most compelling information on asset consumption (depreciation). While the depreciated replacement cost valuation methodology is sound, there is merit in considering asset re-instatement costs, if the assets suffer major damage through a natural disaster.

There are assets providing services that are not valued and the diminution in asset values is not being recognised. Examples include asset data and natural capital. Heritage assets are often valued below their heritage-influenced reinstatement costs and consequently understate depreciation.

Lack of granularity and usefulness of expenditure categories. While financial reporting standards are in place for formal public accountability financial reports, there is a lack of consistency and granularity around financial data that is important for both operational and longer-term management asset management. There is a need for specific operating expenditure classifications. As discussed in section 4.6.

Capital expenditure should be categorised into useful components. Local authorities are required to identify capital expenditure as renewal expenditure, expenditure related to changed levels of service, and expenditure related to demand-driven growth. This assists with decisions on funding sources. There is no equivalent requirement for central government departments to do the same, although the new Cabinet Office Circular CO(23)9 does identify that depreciation funding must be applied to ensure levels and methods of service reflect strategic intentions. There is merit in the local authority capital expenditure categories, that could be extended to other sectors. An additional capital expenditure category should be considered for resilience expenditure.

Several years ago, the Timaru District Council changed from a “deemed cost” valuation of its infrastructure assets to a depreciated replacement cost valuation methodology, which is the technique used by most other local authorities.

Under the “deemed cost” method the Council assessed a cost for its infrastructure as at 2005 and then added acquired and constructed assets at cost each subsequent year.

In 2013 Council’s Annual Report showed the carrying costs of infrastructure assets at \$596 million with depreciation for the year at \$9.5 million.

As a result of the change to depreciated replacement cost valuations the 2021 Annual Report shows the carrying value of infrastructure assets at \$928 million with an estimated replacement cost of \$1,006 million. Annual depreciation has risen to \$19.8 million.

The revised valuation methodology better reflects Council’s investment in its infrastructure and the much greater asset consumption (depreciation) charge.

Lack of long-term financial forecasts. Local authorities are required to produce detailed 10-year forecasts, and more generalised forecasts for a further 20 years via Infrastructure Strategies. However, many other public sector entities have a shorter financial forecast horizon, and they are mainly focused on capital intentions. Financial forecasts should extend to the point of the most long-lived asset in a portfolio, however this is not always practical.

Flawed funding policies. Funding policies and funding mechanisms are compromised by the lack of granular categorisation of capital expenditure, restrictions or legislative hurdles on funding sources, poor cost estimation processes and “short-termism”.

Funds generated through funding the depreciation expense are often applied to other capital works, not to the network that gave rise to the depreciation. We believe a form of ring-fencing of depreciation funds could be appropriate for public sector organisations. Funded depreciation is not always sufficient to meet scheduled asset renewals, particularly if the assets are not valued in the first place, are near the end of their lifecycle, or when there is high inflation. Lack of maintenance and renewal expenditure may also mean that assets do not reach their full useful life, requiring more expensive replacement. Depreciation is often spent on new assets rather than renewals. In these situations, a better indicator of the annual renewal funding needed is to use a yearly average of the ensuing 20-year renewal estimates. The Office of Water Regulator in the UK has used this approach for calculating the depreciation expense.

Quality of project costing. Robust financial input into infrastructure project costing is often absent or illusory. While lip service is given to whole of life project costing, this is often superficial. Whole of life costing should include the cost to retire or dispose of the asset and should recognise the asset consumption and the impact on organisational operating and maintenance costs. While these may be elements in financial models, uncertainty in forecasting can mean these costs are not included so there is not a true whole of life cost.

Under-estimation of depreciation expense and consequential operating costs result in inadequate funding. For example, a multi-use sports arena at an initial cost of \$500 million, will incur future yearly depreciation in the range of \$9-10 million, aside from the additional operational and maintenance costs. Maintenance costs are often higher for new assets, as documented maintenance is required for warranty provisions.

Development funding contributions often fall short of forecasts and do not meet the costs of the infrastructure required for new sub-divisions and developments. Developers often challenge the charging methodology and the administrative effort to introduce funding policies is quite onerous.

Government departments and Crown entities are not required to produce funding and financial policies as local government are. Rigour should be used to determine which government assets should be paid through service charges.

In Australia, the reporting of asset ratios for example comparing the renewal requirement versus the level of depreciation, have assisted auditors and centralised parties to get visibility as to whether local government organisations have been utilising depreciation funding for renewals. No measures are perfect, but consistent measurement and reporting allows investigation of outliers and comparisons to be examined.

The calculation of depreciation expense may not align to asset renewal requirements over the long term. There can be unclear policies around the funding of the depreciation expense and what the depreciation funds will be used for. Depreciation funds are usually earmarked for capital renewals, but often the depreciation funding and the renewals to be undertaken are at different cycles. For instance, a relatively new asset network is likely to generate higher depreciation compared to the short to medium term renewals that might be needed for that network. Conversely, an older network may need high renewals, but the network depreciation expense is less than the renewals needed.

4.8.4 Financial management recommendations

Transparency

- 1. Major infrastructure providers should publicly disclose financial sustainability measures as part of performance measurement disclosures (see Key Recommendation 4).**

Financial sustainability measures could include the percentage of planned maintenance and the percentage of asset renewal of asset replacement values. The Australian local government experiences with financial sustainability measures provide learnings that should be considered for New Zealand.

This has been successful for states that have introduced similar requirements in Australia. The benefits are consistent measures that identify outliers.

- 2. Major infrastructure providers should publicly disclose financial forecasts of infrastructure related expenditure that are long-term (at least 30 years), and include all elements of expenditure with the following categories:**

Operating expenditure	Capital expenditure
<ul style="list-style-type: none"> ▪ Operational expenditure – i.e., keeps the asset providing a service (e.g., fuel) ▪ Planned maintenance ▪ Unplanned (reactive) maintenance ▪ Depreciation and amortisation ▪ Interest on borrowing 	<ul style="list-style-type: none"> ▪ Renewal ▪ Resilience ▪ Level of service change ▪ Growth/decline (changes in response to demand)

Table 4-1: Recommended high-level expenditure categories

Long-term financial forecasts of infrastructure-related expenditure would provide a robust roadmap of the expenditure needs over the next generation. It is important that this information is transparently communicated to decision-makers and the public in general. Greater granularity is required for capital expenditure and adopting common categorisation will assist in establishing, both at an organisation and nationwide level, the level of deferred renewals. This will provide better rationale for funding options and ensure that project business cases are connected to the asset management planning processes.

This would provide more transparency that infrastructure providers are maintaining and renewing assets to optimise the useful life of assets.

3. Issue clear guidance for public sector agencies, on the funding of depreciation and how depreciation funds are to be applied.

Historically, some agencies have used depreciation funding for operational costs. It is poor practice for depreciation funds to fund ongoing operational or maintenance expenditure, as it will lead to deferred renewals or replacements. Providing additional guidance or incentives would lock in good practice. The new Cabinet Office Circular CO(23)9 defines depreciation and now identifies that depreciation funding must be applied to ensure levels and methods of service reflect strategic intentions.

4. Require all public sector entities to disclose funding policies that outline:

- **The source of funding for each category of asset related expenditure,**
- **The rationale for those funding sources,**
- **The funding required for the next ten years, and**
- **The risks that the funding may fall short of what is required.**

As part of good asset management, we believe that all public sector entities, and especially central government, should be disclosing the expected long-term funding sources for asset related expenditure and rationale for those sources. Draft policies would be subject to consultation with the public and major funding agencies. Private sector entities are encouraged to do the same.

5. Funding restrictions presently in legislation such as the Rating Act 2002 should be revised to enable more options for local authorities to fund asset expenditure.

There are too many hoops and hurdles in legislation that hamstring local government funding considerations, especially for rating and development contributions. Local authorities have overarching requirements for sound financial management, so the removal of micro procedural rules and funding restrictions would provide more funding options and pathways.

6. Encourage funders and co-funders to require recipient infrastructure providers to demonstrate good asset management practices as part of the funding conditions.

The success of NZTA as a part funder of local roads, in incentivising strong asset management practices in local road authorities, should be considered for adoption in other sectors. NZTA reviews the asset management plans and practices of road control authorities and requires cost benefit analysis and justifications for proposed expenditure, as a condition of funding. This will give added assurance to agencies that their funding is well spent and ensures that the standard of asset management in recipient organisations is enhanced.

4.9 Asset management plans

4.9.1 What are we talking about and what is included?

Asset management plans are developed and embedded into business and financial planning processes. They provide the business case for the financial forecasts.

An asset management plan documents intended capital and operational programmes for an organisation’s new and existing infrastructure, based on its understanding of demand, customer requirements, and the state of its asset portfolio.

4.9.2 Asset management plans maturity

The asset management maturity assessment for asset management plans considers:

- The quality and completeness of the asset management plan content.
- The alignment of asset management plans with the corporate financial management process.
- The extent to which stakeholders have been involved.
- Reviews, auditing, and approval processes.

Local government is required by legislation to publish LTPs and Infrastructure Strategies. Auditors check whether these are supported by asset management plans and other key decision-making processes. Of the sub-sectors within local government, transport is typically at the highest level of maturity for asset management plans, as these are overseen and reviewed by NZTA.

In the electricity distribution sector, disclosure requirements include asset management plans.

In the central government sector, there is a requirement for investment intensive agencies to have current asset management plans, but there has been only limited compliance monitoring through the ICR.

Private sector organisations are not required to produce or publish asset management .

The weakest sector for asset management plans is the private health sector. There are few organisations in this sector that have asset management plans. Retirement villages have disclosure requirements, but they are very light on asset management.

Sector	Asset Management Plans
Energy: Electricity	Advance
Energy: Gas	Advance
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Core
Transport: Local Roads	Advance
Transport: State Highways	Advance
Transport: Rail	Core
Transport: Sea	Core
Transport: Air	Core
Health: Public Sector	Core
Health: Private Sector	Aware
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Core
Other sectors: Defence	Advance
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-10: Asset Management Plans Maturity

4.9.3 Asset management plans issues

Lack of transparency in some sectors. Good practice includes the development of asset management plans to support good and transparent decision-making. Both the private sector and the central government sector need clear disclosure requirements with scrutiny from an external party, to ensure that they develop and publish appropriate quality asset management plans.

Compliance focus. In local government especially, the development of asset management plans is often seen as a compliance exercise for auditors. The documents tend to focus both on how assets are managed and what investment is required to meet levels of service over a ten-year period. This could be resolved by requiring a separate asset management strategy or roadmap explaining how the organisation manages assets and how it will improve in future, with a separate investment focused asset management plan.

Little use of asset management plans in decision-making.

Many of the asset management plans that are written are overly long and fail to tell the investment story. Effective use of short concise executive summaries, interactive maps, and options analysis are needed to be incorporated into asset management plans to help guide decision-makers.

4.9.4 Asset management plan recommendations

Transparency

- 1. Key Recommendation 5: Require all public major infrastructure providers to publicly disclose a minimum core level, 10-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.**

Asset management plans bring together the evidence to support long-term capital and operational asset requirements and demonstrate that organisations are good stewards of their assets. Some major infrastructure providers do not develop asset management plans and others do not make their plans publicly available. Asset management plans should be aligned to internal and external budget processes and include funding strategies that identify any current and planned funding shortfalls (maintenance, renewal, demand, and service level changes), and how any shortfalls will be addressed.

The asset management plan should demonstrate that the organisation has considered the range of alternatives to manage demand including both asset and non-asset solutions. The following diagram shows the maturity levels of asset management plans from the IIMM:

Asset management plans need to be clear and concise.

The City of Mitcham in South Australia has made their asset management publicly available to residents and interested parties. It is a digitally interactive document, allowing users to zoom in and out of spatial data and filter the information relevant in charts.

It was used as part of the council community consultation and is a good example of making asset management plans more readable and accessible.

[City of Mitcham Stormwater Asset Management Plan \(arcgis.com\)](https://arcgis.com)

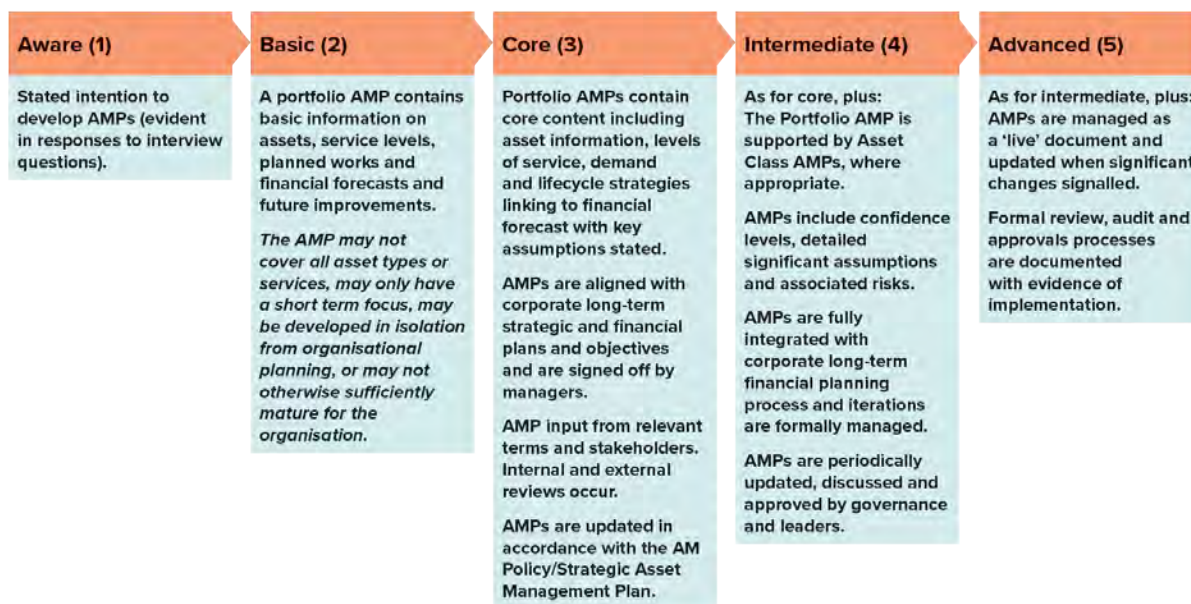


Figure 4-11 Asset management plan maturity levels

2. Encourage organisations to develop a suite of asset management documents including an asset management policy, an asset management strategy (or strategic asset management plan) and one or more asset management plans.

This would provide greater transparency of asset management activities and plans throughout organisations. Many major infrastructure providers do not have one or more of these documents.

Productivity

3. Infrastructure providers need to improve the effectiveness of their asset management plans in providing decision-makers with well-presented trade-offs between cost, risk, and service for the long-term asset decisions.

Asset management plans are often long documents that fail to articulate the investment needs concisely or support effective decision-making. We support more innovative representation through digital, spatial, dashboard systems, or plans tailored for an executive audience.

4.10 People

4.10.1 What are we talking about and what is included?

How an organisation effectively leads and coordinates asset management including, how it is structured and people-resourced to deliver asset management objectives.

“He aha te mea nui o te ao? He tangata he tangata he tangata!”

“What is the most important thing in the world? It is people, it is people, it is people!”

This function considers the capacity and capability of the people in the organisation to effectively lead and deliver asset management. It looks at how the organisation coordinates, and is structured to deliver, asset management functions.

Broader issues related to the availability of asset management professionals in the workforce are covered in section 3.3.3.

4.10.2 People maturity

Specifically, the asset management maturity assessment for People considers the extent to which:

- The organisation effectively leads and coordinates asset management.
- The organisation is structured and resourced to deliver asset management objectives.
- Responsibilities for asset management planning and delivery are defined and allocated internally and externally.
- Everyone understands their role and contributes effectively to the asset management system.

Figure 4-12 illustrates the maturity of the People function across the infrastructure sectors.

- Land transport is the most advanced sector for this function, with a sector-based asset management competency framework that is used by roading authorities.
- Many local authorities have good asset management coordination practices in place, with asset management executive committees to oversee that all parts of the organisation work effectively together for asset management outcomes. These committees typically support the provision of cross-organisational asset management training.

Sector	People
Energy: Electricity	Basic
Energy: Gas	Basic
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Basic
Water and Waste: Solid Waste Management	Basic
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Core
Transport: Local Roads	Advance
Transport: State Highways	Advance
Transport: Rail	Basic
Transport: Sea	Basic
Transport: Air	Basic
Health: Public Sector	Aware
Health: Private Sector	Core
Community: Social Housing	Core
Community: Community Buildings	Basic
Community: Parks and Open Spaces	Basic
Education: Primary and Secondary	Basic
Education: Tertiary Education	Basic
Other sectors: Justice	Basic
Other sectors: Defence	Basic
Other sectors: Land and Forestry	Basic

AM Maturity Scale



Figure 4-12: People maturity

- Strong leadership is a fundamental enabler of mature asset management practices. For the regulated sectors, leadership attention is gained by the need to meet regulated asset management requirements, such as disclosure of asset management plans which are approved by boards and executive teams.

4.10.3 People issues

Asset management governance and leadership is lacking in many organisations, for example:

Governance of the different types of organisations is varied from boards of experienced professionals to elected members of local councils.

The role of governance bodies as asset stewards is not well understood and developed, and infrastructure asset management is often not a core capability at governance level. This is notably an issue in local councils and central government. Asset management is often not included in governance training.

Most governance bodies are not having the right conversations about levels of service, risk and cost trade-offs, and are often not demanding the information and evidence required to make good investment decisions.

Organisational silos impede good asset management.

There is generally poor understanding of the full scope of the asset management system and the need for leadership and integration of cross-organisational processes. An example of immature practice is lack of alignment of asset management plan financial forecasts and corporate financial planning. In the lower scoring sectors, asset management is typically undertaken by a person or small team with limited scope (e.g., focus is just producing an asset management plan).

Asset management capability and capacity is limiting improvement plan progress.

Many sectors and organisations don't recruit or retain sufficient infrastructure management expertise to establish and maintain an effective asset management system. Some organisations aren't large enough to sustain asset management competence and there is often an over-reliance on consultants rather than building internal core capability.

There is a lack of investment in asset management awareness and in asset management roles more generally, especially where there may be less of a direct link to services.

In 2016, the Canadian Government launched the Municipal Asset Management Program, an eight-year C\$110 million program provide grants, technical assistance, training, and awareness activities designed to support asset management capacity building.

In the past, asset management in Canada was piecemeal and limited to practitioners and technical experts managing infrastructure and services in relative isolation. They acknowledge that we are all in difficult times marked by extreme events, high risks, and impacts to service provision, but they are in a much better position than they would have been had they not embarked on this program.

For more information refer to:

<https://insite.ipwea.org/how-mamp-is-helping-asset-management-achieve-maturity-in-canada/>

Asset managers are failing to convince decision-makers of the benefits of asset management

Technical asset managers may not be so good at communicating needs to senior leadership and governance. This affects their ability to secure funding to get investment in asset management improvements. Asset managers need to be able to have strong conversations with both a strategic and an operational lens.

Retention of intellectual property by consultants

Key accountabilities are often outsourced, including management of intellectual property such as asset data and experience of how assets operate. Consultants can be incentivised to make things more complex, rather than producing simple and transparent artefacts that meet audience requirements.

4.10.4 People recommendations

Governance

1. Develop guidance for an asset management accountability framework that:

- a. Defines what is expected from governance and leadership functions (boards, councils, executive teams etc).
- b. Assigns governance and oversight to an appropriate, specific body (e.g., risk and audit committee for some agencies or an infrastructure committee).
- c. Requires accountability for the asset management system to be held by a 2nd or 3rd tier leader, supported by a cross-organisational asset management committee.

It doesn't matter how good the organisation's asset management analytical capabilities are if the decision-makers do not support the asset management system as being the process for determining asset investment and funding needs.

It should be clear where asset management should sit in an organisation and what delivery model is used and why.

Productivity

2. Promote asset management to boards and executive leaders and focus asset management practice and training so that asset management artefacts are suitable for executive and board level.

This would ensure that asset management is understood from a top-down perspective and that asset management practice meets decision-makers' needs.

Hamilton City Council has established asset management governance and coordination structures with representatives from relevant parts of the organisation, including finance, strategic planning, activity managers and data/IT. A central asset management support team brings asset management expertise to support activity managers. This is often a more efficient solution than trying to provide asset management specialists within each activity area.

Chorus is rolling out an asset management implementation programme and is taking a similar approach by establishing a 'centre of excellence' to build asset management capability across the business.

3. Encourage asset management training to occur across the organisation – asset management isn't just the asset manager's role.

As discussed in this report, asset management requires a coordinated approach across the organisation. Customer services and other frontline staff need to understand why the information they collect is so important. Ensuring everyone is trained in their asset management role and delivering the right information to the right places, will help the whole organisation's asset management system to be more effective and efficient.

4. Define asset management competency standards for core asset management roles.

This would ensure there is appropriate competent staff and/or there is transparency and a pathway to achieve the appropriate level of competency at an organisational level.

5. Select enthusiastic asset management coordinators who are good communicators to foster organisational positivity for asset management, and effectively articulate asset management options to decision-makers.

The people factor has been acknowledged for some time as being the most important asset management enabler (or constraint). The historic approach of turning engineers into asset managers has not always worked. Defining competency standards will help get the right people into the right roles and, as above, support the whole organisation's asset management system to be more effective and efficient.

4.11 Evidence

4.11.1 What are we talking about and what is included?

A reliable, well-structured asset database is in place to inform asset planning. Information systems enable effective and efficient asset management. Asset condition and performance is understood (past and future).

A reliable asset register is the foundation for enabling most asset management functions; organisations obviously need to know what assets they own or operate and where they are located. For lifecycle decision-making, the organisation needs to understand the current, and projected future, condition and performance of its assets.

Asset monitoring programmes should be tailored to consider how critical the asset is, how quickly it is likely to deteriorate, and the cost of collecting the data. Timely and complete condition information supports risk management, lifecycle decision-making and financial/performance reporting. For example, data on the physical integrity and performance of assets, gives the asset manager information to forecast the likely end of useful life, and the date the asset needs replacing, to build renewal plans and forward works programmes.

Asset management systems (ICT solutions) have become an essential tool for the management of assets, to effectively deal with the extent of analysis required.

4.11.2 Evidence maturity

This element of asset management maturity considers the extent to which:

- A reliable, well-structured asset register/database is in place to inform asset planning.
- Information systems enable effective and efficient asset management.
- Asset condition and performance is understood (past, current and future).
- Asset condition and performance monitoring programmes are in place, targeted at high criticality and risk assets.

Figure 4-13 presents the maturity for this asset management function.

We note that sectors that have lower overall asset management maturity tend to have correspondingly low maturity of evidence, reinforcing the importance of this enabling function.

Energy, tertiary education, and the transport sectors all have the highest level of asset

Sector	Evidence
Energy: Electricity	Advance
Energy: Gas	Advance
Energy: Fuel	Advance
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Core
Transport: Local Roads	Intermediate
Transport: State Highways	Intermediate
Transport: Rail	Core
Transport: Sea	Core
Transport: Air	Core
Health: Public Sector	Core
Health: Private Sector	Core
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Advance
Other sectors: Justice	Core
Other sectors: Defence	Intermediate
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-13: Evidence maturity

management maturity for the evidence element, indicating reasonably complete and reliable asset databases and fit-for-purpose asset management systems.

Typically, most organisations collect data on the location, type, quantity, dimensions, and performance of assets. Anecdotally, there are still a high number of organisations in Australia, the US and Canada that have little information stored on their assets. This would suggest that New Zealand organisations are ahead in this area, but no studies have been undertaken to support this view. Some asset information system suppliers note that most asset intensive organisations in New Zealand have a reasonable level of asset data.

Local government has had the LGA requiring evidence to support long-term plans since 1996. Most councils have good asset data especially for critical assets, however there are some gaps. Asset data in central government organisations is relatively poor in comparison, and can result in poor decision-making, with some agencies lacking appropriate asset management systems. In the private sector, there are no requirements to disclose the quality of asset data.

4.11.3 Evidence issues

Asset data standards have not yet been implemented: Although large amounts of data are available across local authorities, data is not stored consistently, and key information is sometimes missing. LINZ and MBIE developed national metadata standards, working with local councils and central government agencies to develop standards for the three waters (potable, waste and storm) networks, and for residential and light commercial buildings. The standards were published in 2017 but have not been adopted or maintained. Subsequently the Quake Centre’s Building Innovation Partnership programme has funded the development of data standards for pipe assets for potable, wastewater, and stormwater. NZTA is introducing the Asset Management Data Standard for transport assets.

The problem is that there is little benefit for individual organisations to implement data standards, compared to the cost involved. The main benefits are only realised when rolling up the information and comparing it across entities.

One sector that has managed to define asset performance reporting consistently across its assets is tertiary education, where Tertiary Education Facilities Management Association defines, collects, and compares performance data across organisations.

Operational data is not always collected accurately: Information about how assets are maintained and repaired are crucial to reporting service delivery. This is done erratically across the sectors with some having good data sets with detailed response times and others being totally reactive with little reporting.

The OAG reviewed leading New Zealand’s approach to housing and urban development in in 2023. The OAG review identified that Te Tūāpapa Kura Kāinga should continue to improve its understanding of the housing and urban development system’s current and projected performance, and regularly report on it to the public and stakeholders. OAG recommended that it should strengthen system governance by providing better reporting to support decision-making, including on current and expected housing and urban development outcomes, delivery milestones, and delivery and strategic risk.

[Our recommendations — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](https://oag.parliament.nz)

Condition and performance data is harder (and more costly) to collect for some asset types: Above ground assets are easier to condition assess, and there are several methods to assess road assets. Water pipes, being underground require CCTV inspection and interpretation of video images. CCTV is relatively expensive and as a result, water assets are inspected less frequently. The water pipe network is aged in New Zealand, with a large proportion being installed in the 1950s. Pipes are expected to have long asset lives, but ground conditions, tree roots, seismic activities, and usage among other causes, can mean pipe failures earlier than expected.

Other types of data, such as utilisation, functionality, fit for purpose, and failure rates are only sometimes collected by asset managers.

There are many different asset data systems used in New Zealand, which are provided by commercial suppliers. Each system uses its own data standards, which are implemented by the purchasing organisation, rather than classifying to a recognised standard. This leads to different ways to store data, and little consistency between organisations. In the transport sector, where one system is used by nearly all organisations, data is more consistent and enables comparative performance and efficiency.

Information held in asset management and financial systems isn't always aligned. A very common challenge is the different business needs which drive the level of granularity of financial versus asset data. With the move to better business intelligence tools and use of data stores, this is likely to become less of an issue moving forward.

The Road Efficiency Group has introduced a Data Quality Framework for the transport sector. The framework provides definitions of accuracy, completeness and timeliness of asset data and scoring process to ascertain the overall data quality score. The framework is applicable to other sectors and can be found here:

[REG practice overview – Data quality framework \(nzta.govt.nz\)](https://www.reg.govt.nz/practice-overview/data-quality-framework)

Use of asset data is not always effective: Automation of processes and improved analytics and reporting, offers huge opportunities for efficiency. The main issue in New Zealand is not whether we have data on our assets, it is how we use the data. Despite decades of development, many organisations are still data-rich and information-poor. Using asset data to predict long-term renewal requirements is not done well, with only some asset management systems supporting renewal forecasting. Many organisations fall into the trap of trying to collect too much data or spending too much time getting to 100% confidence levels. More time needs to be spent up front confirming what type of decisions need to be made, and then focusing on the data required to support those decisions.

4.11.4 Evidence recommendations

Note that Key Recommendation 4, for all public major infrastructure providers to report on a consistent set of asset performance measures, will provide better evidence of asset performance.

Transparency

1. Information about critical assets should be included in externally audited major infrastructure providers' annual reports.

There is little transparency across infrastructure sectors, with no requirement for organisations outside of the electricity industry to publicly disclose whether they are responsible for critical assets and the

consequence of their failure. This requirement does not apply to the electricity distributors who already disclose this information.

Productivity

2. Asset performance should be identified and integrated throughout asset and planning lifecycles.

Asset performance is often not considered in-line with asset lifecycles i.e., through strategy (setting asset performance metrics and targets aligned to services), business cases (investment to achieve the desired change in asset performance), and benefits realisation (have we achieved the target asset performance?).

3. Consider opportunities to develop asset management information systems to share across sectors/agencies/industries, ideally using standardised data and metadata schemas to automate sharing and consistency of asset data and practice.

There are many and varied asset management information systems across New Zealand. Sharing of systems across similar infrastructure providers should enable efficiencies and effectiveness improvements.

4. Consider implementation of the Road Efficiency Group Data Quality Framework in other sectors with reporting either to a national body or through annual reports.

This would provide an understanding of the quality of asset data in New Zealand in a consistent and comparable manner. There is currently little evidence to determine whether the quality of asset data is sufficient in New Zealand.

5. Review the learnings from the NZTA metadata standard implementation, and consider whether there is a case for introducing similar standards for other infrastructure assets.

Although the consistent application of metadata standards is ideal, experience has shown that it has been difficult to implement. NZTA is in the process of implementing transport asset data standards and it is recommended that the learnings from this exercise be considered for other sectors.

6. Establish standard definitions and performance metrics through:

- **Clearly defining what is meant by “deferred maintenance” and “deferred renewals”**
- **Performance measures such as the “asset sustainability ratio” (renewal capex as a proportion of depreciation expense)**

To enable asset performance analysis, there needs to be enhanced reporting of key metrics. Common and clear definitions of measures and defining the performance parameters is key to this.

4.12 Service delivery

4.12.1 What are we talking about in service delivery and what is included?

Service delivery options are evaluated and effectively procured. Service delivery providers are effectively monitored and controlled.

The effectiveness of asset management planning is proven in the efficient and effective delivery of services at an operational level. Organisations need to consider the relative costs, benefits, and risks of alternative delivery mechanisms and this is a key opportunity for seeking efficiencies. Lower maturity in this area is likely to be associated with:

- Balance of risk may not be understood resulting in higher contracting costs
- Contractor performance not aligned with asset management objectives, which weakens the overall asset management system and performance and leads to poor service outcomes.

4.12.2 Service delivery maturity

The maturity assessment for this element considers:

- how well an organisation procures assets and asset-related services like maintenance and consumables for different classes of assets, and
- exercises control over outsourced asset management services.

This element scored more consistently across basic and core, and this is in-line with requirements under the government rules of sourcing, noting that procurement has been a focus area over the past ten years.

There have been numerous reports on the lack of progress in achieving capital programmes in the public health sector, including extensive delays in shovel-ready and mental health infrastructure programmes. The new Dunedin public hospital has significant scope and funding challenges.

4.12.3 Service delivery issues

Service delivery is not in sync with formal asset management lifecycle strategies. Frequently, there is a lack of alignment between contracted service delivery and asset management strategies. Traditional procurement processes can be very prescribed and inflexible, with little incentive for a contractor to be brought into the wider life cycle approach. We often hear that contractors at the coal face have the best appreciation of what's

Sector	Service Delivery
Energy: Electricity	Core
Energy: Gas	Core
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Basic
Transport: Local Roads	Core
Transport: State Highways	Core
Transport: Rail	Core
Transport: Sea	Basic
Transport: Air	Core
Health: Public Sector	Basic
Health: Private Sector	Basic
Community: Social Housing	Basic
Community: Community Buildings	Basic
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Core
Other sectors: Defence	Intermediate
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-14: Service delivery maturity

happening to the assets, and have ideas on how they can be best managed, yet they are not party to developing formal asset lifecycle strategies. Often this is exacerbated when external consultants are engaged to write asset management plans, especially when consultants are putting together desktop plans without wide consultation.

Outsourced providers may not be delivering contracted asset management – there can be a requirement to provide asset management data through outsourced service delivery providers, but we have observed that this may not always be enforced, and the contract specification may not align to in-house asset management requirements. Contract models may not prioritise, or contract management may not pick up when data flows are not as contracted and/or not enforce the contract provisions. The in-house asset management team may not have visibility of the contract and/or contract management of infrastructure service delivery.

Complicated organisational structures result in delivery processes becoming cumbersome and too compliance focused. Often organisations that are too small lack the skills to manage service delivery effectively, and organisations that are too large can become overly bureaucratic. This report does not examine this in detail, but there may be an optimum size and type of organisation for specific infrastructure.

Project delivery doesn't provide full output – change requests often reduce scope to balance time and costs, and process and asset life-cycle improvements are generally the first things to be de-scoped. This contributes to asset management practice possibly being more manual and un-systematised.

Consistency in analysis and planning function – planning is currently conducted at the organisation level but could be at sector or local community level and/or leverage across sectors. This means that national infrastructure trade-offs are not transparent and are hard to assess without consistent source data/evidence.

4.12.4 Service delivery recommendations

Productivity

1. **A review of service delivery models at a sector or agency level should be undertaken to ensure accountability, responsibilities, and incentives are aligned with control and asset ownership, including development of model contracts, RACI roles and responsibilities matrices, and risk registers to identify what is better delivered in-house vs outsourced.**

There is significant outsourcing of asset management activities in some sectors and functions, such as in roading and facilities management. These contracts may be inhibiting good asset management and/or do not align to accountability and being a smart buyer.

*The 2020 OAG review of state highway Network Outcome Contracts identified that while most of the key result areas were aligned to NZTA outcomes, other performance measures were based on outputs or compliance as opposed to outcomes. New contracts were to consider key performance indicators on the **condition** of the roading network.*

[Summary of New Zealand Transport Agency: Maintaining state highways through Network Outcomes Contracts \(oag.parliament.nz\)](https://www.oag.parliament.nz/summary-of-new-zealand-transport-agency-maintaining-state-highways-through-network-outcomes-contracts)

NZTA identified that all NOCs used an updated Version 5 of the Key Result Areas from 2020/21.

- 2. More comprehensive contract management should be in place for service delivery contracts relating to infrastructure, with standardised contract management processes and dedicated contract management expertise.**

The previous focus has been on government rules of sourcing and procurement with less focus on management of contracts. There is anecdotal evidence that some outsourced contractors are not delivering asset data and asset management functions in-line with contracts, but this is not being managed at a contract level.

- 3. There should be a future pipeline of all outsourced contracts relating to infrastructure management (not just project delivery contracts).**

Contract lifecycles need to be managed and more visibility of future contracts may improve agencies' effectiveness.

- 4. Ensure that asset management activities and understanding are fully integrated into the requirements as part of the procurement process, including contractors being able to influence asset levels of service and contribute to asset management plans and artefacts in a partnership model.**

Contractors are often at the coalface and can have a valuable input into asset management practices and artefacts, particularly in the operational and maintenance aspects.

- 5. Asset management information systems should be in place with standardised data schemas to allow automated data flows between outsourced providers and organisations.**

The data from outsourced providers should be integrated into organisations' base asset data, and the responsible organisation should maintain the intellectual property of asset data.

4.13 System and improvement

4.13.1 What are we talking about and what is included?

There are well-defined and documented asset management processes that are managed within a quality system. The organisation takes a continual improvement approach towards an appropriate level of asset management maturity.

Well performing organisations give careful consideration of the value that can be obtained from improving asset management information, processes, systems, and capability. The focus is on ensuring that asset management practices are appropriate to the business objectives and governance requirements.

A strong continual improvement programme is essential for progressing asset management maturity, realising the benefits of optimising asset management practices, and being able to demonstrate these to governance and executive teams.

A strong quality management framework within which critical asset management processes are documented, reviewed, and updated, will help the move from process knowledge held in people’s heads. This will prevent critical knowledge being lost as people move and provides a useful framework for reviewing the efficiency of asset management processes.

4.13.2 System and improvement maturity

The maturity assessment for system and improvement considers the extent to which:

- There are well-defined and documented asset management systems and processes that are managed within a quality system.
- The organisation takes a continual improvement approach towards an appropriate level of asset management maturity.

System and Improvement is the lowest scoring element across all sectors, with even the more mature sectors at basic or core. This scoring is consistent with our overall observations in asset management where maturity has stagnated over the past ten years, and we are not seeing the full benefits realised of asset management.

Sector	System and Improvement
Energy: Electricity	Core
Energy: Gas	Core
Energy: Fuel	Core
Telecommunications	Core
Water and Waste: Three Waters	Core
Water and Waste: Solid Waste Management	Core
Water and Waste: Rivers/Flood Control	Core
Water and Waste: Irrigation	Basic
Transport: Local Roads	Core
Transport: State Highways	Core
Transport: Rail	Core
Transport: Sea	Core
Transport: Air	Core
Health: Public Sector	Basic
Health: Private Sector	Basic
Community: Social Housing	Core
Community: Community Buildings	Core
Community: Parks and Open Spaces	Core
Education: Primary and Secondary	Core
Education: Tertiary Education	Core
Other sectors: Justice	Core
Other sectors: Defence	Core
Other sectors: Land and Forestry	Core

AM Maturity Scale



Figure 4-15: System and improvement maturity

4.13.3 System and improvement issues

Failure to consistently invest in asset management improvement activities – making meaningful maturity progress needs sustained effort and may take years or even decades to fully realise well-functioning, embedded and sustainable asset management. Often asset management improvement activities are resourced as one-off, which can mean improvement is not sustained. Asset management doesn't work as a stop-start activity and needs to be built and sustained with continued focus and resourcing.

Improvement plans not actioned – asset management practice requires the implementation of asset improvement plans. Too often we see there is little progress in actioning asset improvement plans as there are too many action items, they are not prioritised, not inter-linked, and not governed appropriately. Improvement programmes are most often not resourced appropriately, with limited or poor change management.

Lack of accountability for the asset improvement plan and no consequences for inaction – there is a lack of audit review and governance/ownership for achieving asset improvement plans. Asset improvement plans need a long-term view and there is a lack of long-term documented accountability. Asset improvement plans are not generally required, even in mature sectors such as electricity distribution, and are not published. Executives are not accountable for inaction or for achieving only limited asset management improvements.

Asset management maturity targets or accredited standards not in place – there is no mandatory requirement to undertake asset management maturity assessments and no asset management maturity targets across most sectors. The ICR run by the Treasury did include identification of an asset management maturity target level, but that programme has now been discontinued. We believe there should be mandated asset management maturity assessments for organisations delivering critical services reliant on infrastructure, with appropriate target levels identified and supported by externally reported asset improvement plans.

International standard ISO 55000 is a globally recognised asset management standard and is incorporated into NZ asset management guidance (the IIMM and the Āpōpō Guide). The ISO 55000 standard is not widely used to seek accreditation in New Zealand as the compliance costs are high, although there are an increasing number of major infrastructure providers seeking alignment.

Sharing isn't systemised - there are some good examples of sectors working to improve asset management, such as the electricity networks and roading (RIMS) in the local government sector. There are limited forums in some sectors, other than professional associations, to make sure that we can leverage good practice across sectors. Treasury ran an "asset management community of interest" for central government that was well-regarded for a time, but they have de-prioritised these and there is

The Commerce Commission completed a targeted review of Electricity Distribution Businesses (EDBs) asset management in 2021. This identified potential improvements in: EDBs asset management plan disclosures; asset management practices and related disclosures; and information disclosure requirements.

In response, the Electricity Networks Association identified there is an opportunity for EDBs to enhance their asset management improvement reporting in their AMPs. EDBs are some of the more mature in terms of asset management practices but there is still an identified lack of transparency on asset management improvement.

[Commerce Commission - Reporting of asset management practices by electricity distributors \(comcom.govt.nz\)](https://www.comcom.govt.nz/reports-and-publications/asset-management-practices-by-electricity-distributors)

limited collaboration and leveraging of asset management practice in central government. There is room to collaborate and share practices further.

Lack of quality systems and documentation – for some sectors there are good systems and process documentation in place, but there can be a reliance on the experience of asset managers, which can cause issues with single-person dependencies and lack of hand-over processes and asset data. There have been examples where asset failures have been caused by staff turnover, such as Aurora Energy.

4.13.4 System and improvement recommendations

Transparency

- 1. Key Recommendation 3: Require all public major infrastructure providers to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.**

Asset management maturity assessments identify the asset management gaps and ensure effort and momentum in achieving improvements in asset management. While annual self-assessments are recommended, value can be added through an independent review process (verified periodically as identified by system lead potentially every three to five years).

In some sectors there is limited oversight or scrutiny to ensure that there is appropriate asset management practice. Some organisations have undertaken assessment maturity assessments in New Zealand, but there is insufficient empirical evidence to determine a baseline. If Asset Management maturity assessments have been completed, they may not be disclosed or publicly available.

Transparency and oversight of asset management practice and infrastructure management as identified above, should be the domain of system players and central agencies. There is limited asset management expertise in central agencies and no identified system lead for asset management. There have been limited effective incentives or enforcement of requirements for central agencies to invest in asset management practice and capability.

We believe that asset maturity assessments lead to improvement in asset management practice, but acknowledge that independent verification may not be practical for smaller infrastructure providers with limited resources.

Productivity

- 2. Develop a common rating process and tool across different types of asset management assessments to enable comparison of results.**

There are several different asset management maturity assessment methods, and a common rating would allow sectors and organisations to choose the methodology that suits their needs, while still allowing comparability and reporting of maturity across the infrastructure system.

The Queenstown Lakes District Council embedded a culture of improvement by:

- Dedicated, collaborative team with staff development plans*
- Recognition by leaders of risks and long-term payback of improvement*
- Annual, external audits of asset management maturity improvement progress*
- Audits of maturity against the IIMM framework*

(IIMM Case Study 4. 6. 1a: Progressively Maturing Asset Management Practices)

- 3. Organisations should have dedicated resourcing (people and funding) in place, whose primary responsibility it is to monitor the asset management improvement plan and implement improvement actions, and this should be separate from business-as-usual work.**

A common problem is there is insufficient capacity or skill set to deliver improvements and pro-active improvement programmes, as staff tend to prioritise re-active work.

- 4. Quality management for asset management should be identified in sector settings and be in place at an organisation level, including defined asset management processes, documentation, asset data structures, systems, and automation.**

Quality management systems for asset management is an identified area of weakness, even in more mature sectors. Asset management practice and maturity can regress quickly due to staff turnover without appropriate quality management.

- 5. Develop national guidance on how to incorporate Treaty obligations and a Māori world view in the asset management system.**

Asset management stewardship closely aligns to Te Ao Māori principles, and it would be more effective to develop the framework at a national level, so it can then be customised for local needs.

- 6. Conduct a review of asset management requirements and their enforcement in the central government sector.**

Investment-intensive government departments and Crown entities have benefitted in the past from the four-yearly review of asset management practices through the ICR process, but this is now discontinued under the new Cabinet Office Circular CO(23)9. An evaluation of the approach and system settings might identify further areas of improvement at a sector level to improve effectiveness and integrate asset management practices more widely into the significant issues such as financial and environmental sustainability.

5. Conclusions and recommendations

5.1 Observations

Overall, for a small country, our system for managing infrastructure assets is complex.

Across the sectors there is huge variety in how infrastructure asset management is governed and regulated, and the organisational types and service delivery mechanisms. This itself isn't a bad thing if there are good reasons for the differences. But there is opportunity to streamline asset management requirements and approaches and learn from the best models. Adopting more principle-based models could help keep things simple but allow for differences where required.

As expected, asset management maturity is generally higher in the more critical infrastructure sectors - including energy, transport, and water

The health sector is the stand-out exception, which is highly critical and yet poor asset management and poor physical infrastructure is affecting wellbeing and health outcomes (noting clinical equipment is generally well-managed).

Organisations in critical lifeline utility sectors, consider themselves primarily infrastructure providers and have high levels of infrastructure management expertise, compared to sectors such as education and health, where good assets are important enablers but not necessarily seen as core to the service delivery.

High asset management maturity doesn't always equate to high quality service outcomes

We would expect that if appropriate system settings and appropriate organisational asset management should lead to good outcomes, in that infrastructure services were meeting customer requirements and likely to provide services as required in the future.

However, scanning the maturity results raises some key questions, such as why is land transport showing at relatively high levels of maturity when we know that levels of service have decreased? Road congestion in urban areas and potholes in rural areas are common complaints in New Zealand, and road condition has suffered significantly under very wet conditions recently.

We conclude that there are many reasons why improving asset management practices doesn't always improve service outcomes, including the system settings they operate in, funding constraints, lack of effective governance and political trade-offs.

Other reasons are that organisational asset management systems:

- Have areas of weakness in certain asset management functions – the system is only as strong as it's component parts and its weakest link. For example, System and improvement, Levels of service and People (governance and leadership) are critical asset management functions that impact the whole asset management system and generally had the lowest maturity.
- Generate unaffordable and unrealistic work programmes given the global and national resource constraints.
- Are not well connected into corporate financial processes and decision-making.

Asset management regulation and scrutiny has supported higher levels of maturity in some sectors

New Zealand was an early adopter of legislation to require long-term infrastructure plans (Local Government Act 2002), and then to introduce asset management requirements into price-quality regulation of monopolistic sectors (driven by high-profile electricity failures in the early 2000s).

However, despite regulation occurring first in local government, asset management maturity is generally higher in the regulated energy and transport sectors. One reason is more effective and active regulators (Commerce Commission, Civil Aviation Authority, Electricity Authority), as evidenced in the Commerce Commission intervention in Aurora⁴⁵. Another is having governance bodies (such as Independent Boards) that are highly aware of the criticality of assets to service delivery and are focussed on managing risk and achieving regulated reliability and other standards.

But not in others

Despite being one of the first sectors to have legislated asset management requirements, local government asset management maturity is highly variable. The three-year political cycle does not mesh well with trying to achieve stable, long-term asset management programmes and funding certainty. Affordability for local communities is always a major concern and infrastructure services compete for limited funding. Councils may commit to good asset management in policies, but in practice the necessary funding to improve outcomes such as condition assessment and planned maintenance programmes, are often cut.

Some sectors have very little asset management regulation, and low maturity

Central government asset management maturity is generally lower than other sectors and has more elements rated as “basic” and “aware”. Long-term plans, other than the National Land Transport Programme, are not required, and while asset management plans were mandated in 2019, most government agencies do not have comprehensive asset management plans across their asset portfolios.

The Treasury ICR programme was in place from 2015 to 2021, to assess departments and Crown agencies with significant infrastructure, but was discontinued with the release of Cabinet Office Circular CO(23)9⁴⁶ in September 2023. CO(23)9 introduced new attestation requirements designed to increase accountability and to provide an incentive to increase agency capability however, the effectiveness of these changes has yet to be determined. Given the \$267 billion⁴⁷ in property, plant, and equipment asset values in government accounts, this lack of asset management progress should be concerning to all taxpayers and government service users.

However, there are pockets of asset management excellence in all sectors

The asset management maturity results presented in this report are sub-sector averages only. In all sectors there are pockets of excellence that we highlight in brief case studies in this report, and are included in case studies in the IIMM and Āpōpō Guides. Advanced asset performance modelling, supported by a good asset evidence base, is driving more robust long-term renewal forecasts for some organisations. There are some excellent examples of customer engagement on infrastructure service levels in the local government sector. Private sector competition drives good practices around understanding customers and demand requirements.

⁴⁵ [Commerce Commission - Aurora Energy Limited \(comcom.govt.nz\)](https://www.comcom.govt.nz)

⁴⁶ [CO \(23\) 9: Investment Management and Asset Performance in Departments and Other Entities - 18 September 2023 - Cabinet Office \(dpmc.govt.nz\)](https://www.dpmc.govt.nz)

⁴⁷ [fsgnz-2023-charts-data.xlsx \(live.com\)](https://www.fsgnz-2023-charts-data.xlsx), Financial Statements Government of New Zealand as at 30 June 2023, table 14

A key feature of almost all these success stories is getting the right people together with a passion for infrastructure, including a champion at the Executive and/or Board level.

5.2 Key issues

There is limited awareness of the 'what' and 'why' of asset management

For many infrastructure sectors, there is a low awareness of asset management, even in the regulated sectors that require asset management planning and information. Some still see asset management as a specific technical process such as developing capital projects, or asset maintenance, rather than a holistic, strategic process. There is generally a poor understanding of what asset management encompasses in New Zealand by citizens and many infrastructure decision makers.

People are the biggest constraint in improving infrastructure asset management maturity in New Zealand

There are workforce shortages across the infrastructure sector. This is a key issue because while most organisations are struggling to fully achieve core practice, advanced asset management practices need higher levels of resourcing and capability (good data management, advanced analytics, more inspections, and planned maintenance and all the other features of a mature asset management organisation).

Leadership and governance of the asset management system is poor across most sectors. The ability of asset managers to educate and present evidence and trade-offs to decision-makers is an issue.

There is little transparency of infrastructure and asset management performance and planning

Other than regulatory performance disclosures, such as reliability measures in the electricity industry and customer access to telecommunications, there was little readily available national information on infrastructure performance. Lack of user-friendly access to infrastructure performance information is a key gap identified.

There is limited published, useful information on the long-term future intentions to fund infrastructure and any impacts on future asset service performance. There should be transparency for service users where funding is likely to see a deterioration in asset service levels and performance.

There is insufficient provision for renewal and maintenance of infrastructure

Asset management, if embedded and operated effectively at an organisation-level, should identify where funding should be prioritised and identify where asset service levels will deteriorate due to insufficient funding. In some cases, asset management plans show the funding gaps, but there is no appetite or insufficient funding to achieve the investment identified in the asset management plan.

In local and central government, depreciation funding has often not been prioritised for renewals, and has been diverted into new assets or level of service improvements in other areas. This can mean there is insufficient reserves or funding to renew the existing assets, leading to asset degradation.

The Te Waihanga Infrastructure Strategy recommends including additional infrastructure funding (*Recommendation 54: Increase infrastructure funding to meet our infrastructure challenges and boost productivity*) and Te Waihanga has produced several other reports on infrastructure funding.

The worst-case scenario is a lack of infrastructure funding and a lack of asset management practices to identify the likely implications of underfunding on services requiring critical infrastructure. This is almost certainly likely to see a decline in service levels and increased risk (critical asset failures) in those areas.

Demand planning and management generally needs much more focus

Demand planning and management is often poorly done, with many organisations only considering the Statistics NZ population forecast and ignoring other demand influences. Demand management is a critical asset management function, yet many sectors are disincentivised to reduce customer demand where there is user-pays funding. Understanding the complexity of demand and customer behaviour, producing demand forecast scenarios to reflect uncertainties in assumptions, and effectively using demand management strategies, should be a key focus area.

Optimising operational programmes has a long way to go

Lifecycle optimisation practices are required for more advanced asset management and capital decision-making. Business case approaches are widely adopted to enable the optimal solution to be selected, considering lowest lifecycle costs.

However, few organisations can quantify their optimal level of planned versus reactive maintenance. Predictive modelling tools are used in a few sectors to model the level of service and cost impacts of varying levels of planned maintenance and renewal investment. But even in these sectors, a better information base is needed for high quality decisions.

Anecdotally, through the early 2000s, New Zealand was regarded as world-leading with the development of the IIMM and early adoption of asset management by local government. We do see that the innovative practice in asset management has now stagnated and other countries such as Canada, United Kingdom, and Australia, have advanced further in some areas.

Central government sectors have the lowest level of maturity

There is very little scrutiny and transparency on the capital side for central government agencies. Most reporting and performance processes, including the PFA, are focussed on operating appropriations, and focus has been on investment management practices, such as portfolio management and business cases. These frameworks tend to focus on new investments, with less focus on the \$267 billion of existing assets⁴⁸. This has been reflected in investment decisions where announcements are made to fund new infrastructure, diverting funding and resources away from managing existing assets.

Asset management should be fundamental and integrated into the investment management frameworks for agencies with critical infrastructure. There has been a low appetite in successive governments in addressing deferred maintenance backlogs.

System and improvement is one of the lowest scoring functions for all sectors

This indicates poor quality management of asset management processes generally, as well as poor practices surrounding maturity assessments, gap analysis and management of asset management improvement programmes. This is evidenced as lack of (or even decline) in progress for many sectors over the last ten years.

Why? Unfortunately, often asset management improvement budgets are cut during budget reviews. But this is also an outcome of many of the other issues noted in this report – staff shortages, lack of cross-organisational commitment to major asset management improvements, and lack of leadership of asset management.

⁴⁸ [fsgnz-2023-charts-data.xlsx \(live.com\)](#), Financial Statements Government of New Zealand as at 30 June 2023, table 14

5.3 Key recommendations

The following key recommendations have been highlighted in this report. We recognise that some sectors already have these practices in place, to varying degrees. Figure 5-1 (Energy, Telecommunications, Water, and Transport) and Figure 5-2 (Health, Community, Education, Other sectors) summarise the extent to which each recommendation is relevant to that sector and is likely to provide benefits. The full recommendation text is included below as they are paraphrased in Figure 5-1 and Figure 5-2:

Theme one: Governance

Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.

Key Recommendation 2: Require all public major infrastructure providers to have an identified and accountable governance body and/or executive lead for asset management. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

Theme two: Transparency

Key Recommendation 3: Require all public major infrastructure providers to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

Key Recommendation 4: Require all public major infrastructure providers to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

Key Recommendation 5: Require all public major infrastructure providers to publicly disclose a minimum core level, 10-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other major infrastructure providers should meet this requirement especially where they are providing critical infrastructure.

Theme three: Resilience

Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other major infrastructure providers should be encouraged to meet this requirement.

Theme four: Productivity

Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.

Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.

Note the two figures below show the relevance of the key recommendations for each of the 23 sub-sectors reviewed. More details on the rationale of this relevance are included in the sector recommendations sections in Appendix six.

“High” is high relevance (and likely to lead to the most benefits), “Medium” is medium relevance (and likely to lead to benefits), and “Low” is low relevance (and less likely to lead to benefits).

Key Recommendations		Sector relevance - Energy, Telecommunications, Water , and Transport												
		Energy			Telecoms	Water				Transport				
		Electricity	Gas	Liquid fuels	Telecoms	3 Waters	Solid waste	River & flood	Irrigation	Local roads	State highways	Rail	Air	Sea
Governance	Key Rec 1: Establish a system lead for infrastructure AM.	High	High	High	High	High	High	High	High	Medium	High	High	High	High
	Key Rec 2: MIPs* to have an accountable governance and/or executive lead for AM.	Medium	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium	Low	Medium	Medium	Medium
Transparency	Key Rec 3: MIPs to periodically undertake an independently verified AMMA and publicly report on the results (including appropriate targets).	High	High	Medium	High	High	High	Medium	Medium	Medium	Medium	High	High	High
	Key Rec 4: MIPs to report on a consistent set of asset performance measures across the infrastructure system.	Medium	Medium	High	High	High	Low	Medium	Medium	Low	Medium	Medium	High	High
	Key Rec 5: MIPs to disclose a minimum core level, 10-year AMP, updated at least three yearly, subject to external scrutiny.	Medium	Medium	Medium	High	High	Medium	High	Medium	Low	Low	High	High	High
Resilience	Key Rec 6: Introduce incentives for MIPs to prioritise infrastructure resilience and consider a national plan and funding pathway for resilience investment.	High	High	Medium	High	High	High	High	High	High	Medium	Medium	High	High
Productivity	Key Rec 7: Invest in AM training programmes and develop a clear training and professional pathway for asset managers.	High	High	High	High	High	High	High	High	High	High	High	High	High
	Key Rec 8: Require all MIPs to demonstrate coordination of regional demand planning across infrastructure sectors.	High	High	Medium	High	High	High	High	High	High	High	High	High	High
*MIPs = Major Infrastructure Providers														

Figure 5-1: Key Recommendations relevance for Energy, Telecommunications, Water, and Transport sectors.

Key Recommendations		Sector relevance - Health, Community, Education, Other									
		Health		Community			Education		Other		
		Public	Private	Social housing	Comm buildings	Parks	Primary & Secondary	Tertiary	Defence	Land & forests	Justice
Governance	Key Rec 1: Establish a system lead for infrastructure AM.	High	High	High	High	High	High	Low	High	Medium	High
	Key Rec 2: MIPs* to have an accountable governance and/or executive lead for AM.	High	Medium	Medium	Medium	High	Medium	Medium	Low	Medium	High
Transparency	Key Rec 3: MIPs to periodically undertake an independently verified AMMA and publicly report on the results (including appropriate targets).	High	High	High	Medium	High	High	Low	High	Medium	High
	Key Rec 4: MIPs to report on a consistent set of asset performance measures across the infrastructure system.	High	Medium	Medium	Medium	Medium	High	Medium	Low	Medium	High
	Key Rec 5: MIPs to disclose a minimum core level, 10-year AMP, updated at least three yearly, subject to external scrutiny.	High	High	High	High	High	High	Medium	Low	High	High
Resilience	Key Rec 6: Introduce incentives for MIPs to prioritise infrastructure resilience and consider a national plan and funding pathway for resilience investment.	High	High	High	High	Medium	Medium	Medium	Medium	High	High
Productivity	Key Rec 7: Invest in AM training programmes and develop a clear training and professional pathway for asset managers.	High	High	High	High	High	High	High	High	High	High
	Key Rec 8: Require all MIPs to demonstrate coordination of regional demand planning across infrastructure sectors.	High	High	High	High	High	High	High	Low	High	High
*MIPs = Major Infrastructure Providers											

Figure 5-2: Key Recommendations relevance for Health, Community, Education, and Other sectors.

6. What comes next?

This State of Play has made eight key recommendations for improving asset management across all sectors, as well as specific recommendations for the 23 sub-sectors reviewed. While these recommendations are based on a high-level preliminary assessment, all major infrastructure providers should review the overall recommendations and any sector-specific recommendations that apply to develop an approach to improve their asset management capability and processes where appropriate.

Sector-wide leadership and participation will be necessary to improve the state of play of asset management in New Zealand. This will involve credible industry associations as well as support from central agencies.

Public sector system leaders within central and local government should also read this report and formulate appropriate responses for how they believe the included recommendations should be addressed. This may include providing Te Waihanga with their insights on feasibility, and implementation approaches. Te Waihanga will be engaging with system leaders to ensure that asset management continues to be a key area of focus.

Appendix one: IIMM asset management maturity framework

The table below identifies the AMMA from the International Infrastructure Management Manual (IIMM) digital edition. This version was substantially updated from previous versions in the 2016 and 2018 edition of the IIMM to focus on embedded practice and align to ISO 55000 to 55003 standards.

The writers of this report have completed high-level assessments of sectors using an abridged version of the AMMA based on existing knowledge and publicly available information to establish the relative strengths and weaknesses of asset management in Aotearoa across 23 sectors. The asset management maturity results presented in this report are sector averages only.

IIMM extract used with permission of Āpōpō - Infrastructure Asset Management Professionals Inc, and IPWEA Ltd.

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
1. Analysing the Strategic Direction	The organisation demonstrates an awareness of its external and internal strategic environment (evident in responses to interview questions).	A high-level, informal strategic analysis has been carried out to determine major trends (strategic issues) influencing the delivery of AM, and the results documented. Strategic organisational planning may be in place but not integrated with asset management.	Governance and leadership expectations of the AM System are expressed through an approved and AM Policy and AM Objectives. The AM policy and objectives cover all aspects of the asset lifecycle. The AM policy and objectives are being actively applied. The AM Objectives are aligned to organisational objectives.	As for Core, plus: The AM Policy and Objectives have been developed with demonstrable consideration of the implications of: · Analysis of the strategic context (internal, external, customer environment) analysed. · Analysis of the asset portfolio to determine fitness-for-purpose (current and future).	As for Intermediate, plus: Achievements against AM Objectives and AM Policy are regularly monitored and reported. Regular environmental scans are in place to identify strategic changes implicating the AM System and required changes are managed through SAMP and AMP review processes.
2 Levels of Service Framework	The organisation recognises the benefits of defining levels of service, but they are not yet documented or quantified (evident in responses to	Customer Groups defined and requirements informally understood. Some key performance measures have	Customer groups needs or expectations are analysed and documented. Level of service statements cover a range of service attributes and are: · aligned with the organisational service planning and performance management processes · periodically measured and reviewed · aligned and integrated with performance	As for core, plus: Service level options (with associated risks and costs) have been presented to executive and governance teams to support level of service decisions. Levels of service are integral to decision making and business planning, with evidence that AM strategies and decision frameworks	As for intermediate, plus: A customer and stakeholder communications plan is in place outlining processes for engaging with customers and stakeholders, with evidence the plan is implemented. Key customers and stakeholders are presented with, and consulted on,

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
	interview questions).	been defined for the activity.	measures. Level of service and cost relationship understood and described in the AMP.	are aligned to the levels of service framework. Asset (technical) performance measures are aligned to service (customer) performance measures.	significant service levels and options, with key outcomes documented in the AMP.
3 Demand Forecasting and Management	Future demand requirements generally understood but are not well documented (evident in responses to interview questions).	Demand forecast trends based on knowledgeable staff. Demand drivers are understood and described. Demand management strategies are being developed. Some basic demand information is being collected and monitored.	Demand forecasts are based on relevant primary demand factors (e.g. population growth) and extrapolation of historic demand trends. Demand forecasts are presented in the AMP with supporting assumptions. Risk associated with demand change are broadly understood and in the AMP. Strategies to manage demand (demand management strategies, asset-responses) are documented in the AMP. Demand management is considered in investment evaluations.	Demand forecasts are based on analysis of historic demand trends and all <i>material</i> demand factors. A range of demand scenarios is developed (e.g. high/medium/low) and presented in the AMP with supporting assumptions. Strategies to manage demand (demand management strategies, asset-responses) are documented in the AMP with supporting evidence that costs and benefits have been evaluated in determining the best strategy. Demand management is considered in all strategy and capital project decisions.	As for Intermediate, plus: Risk assessment carried out for different demand scenarios with mitigation actions identified and evaluated in determining the appropriate demand forecast scenario for AM planning. Sensitivity testing is carried out to determine confidence levels in demand forecasting scenarios. Demand risks are included in organisational risk registers.
4 Asset Condition and Performance	The need for condition and performance information is understood but is not quantified or documented. (evident in responses to interview questions).	Condition and performance information is based on knowledgeable staff and is described in the AM Plan. Some asset condition and performance data is collected but is not well-linked to defined levels of service and performance measures.	Adequate data and information is collected to report current performance against levels of service. A condition and performance monitoring process is documented and followed for critical assets. Condition and performance information is suitable to be used to plan and prioritise short-term maintenance and renewals. Performance results are reviewed to identify areas failing to achieve targets.	A condition and performance monitoring strategy and programme is developed for all assets, with consideration of factors such as asset criticality, inherent risk, lifecycle and demand. Condition and performance information is routinely captured and updated in line with the programme. Future condition and performance information is modelled to assess whether levels of service can be met in the long term. Performance results are regularly evaluated to determine appropriate responses.	The condition and performance assessment strategy is implemented and audited with a 5+year data history.
5 The Strategic Asset	The organisation is aware of the	The AM System is broadly understood	The scope of the AM System is defined. The links between organisational and AM	As for Core, plus: The relationships and processes between the	A SAMP is in place, with content as per ISO 55002.

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
Management Plan	concept of, and benefits of, a SAMP and AM System (evident in responses to interview questions).	in terms of the assets and functions covered. A process for the establishing the AM System has commenced. (though these aspects may not be documented in a 'SAMP').	objectives are defined. The process for establishing and maintaining the AM System is developed. Strategic issues have been identified and options developed. The above aspects are documented in the SAMP or equivalent document. SAMP input from relevant teams and stakeholders (internal and external) occurs.	AM System and other parts of the organisation are defined in the SAMP or equivalent document. Strategic issues and options have been analysed and prioritised and a long-term strategy has been developed. A regular SAMP review and approvals process is in place.	Formal review, audit and approvals processes are documented with evidence of implementation.
6. Managing Risk and Resilience	Risk management is identified as a future improvement (evident in responses to interview questions).	High level organisational risks are identified and reported to management. Critical services and assets are understood and considered by staff involved in maintenance / renewal decisions (evident in responses to interview questions).	An organisational risk management policy, framework and process is in place. An asset criticality framework has been developed and critical assets are recorded in the AMIS. Activity risks are identified in the risk register and regularly updated and monitored. Management strategies for highest risks and most critical assets are developed and documented (in the AMP, risk management plan or similar). The approach to managing asset network resilience is described in the AMP or other supporting document.	As for core, plus: A resilience strategy has been developed (may be part of the SAMP or AMP and is being implemented). Systematic risk analysis and resilience considerations are incorporated into major decisions. The risk register is regularly updated, actions monitored and reported to management. Risk is managed, prioritised and escalated consistently across the organisation.	Asset risks are assessed for multiple failure modes. An ongoing programme of asset network and organisational resilience assessments are completed with improvements identified and actively progressed. Risk and resilience levels are quantified for the organisation and risk mitigation options to close identified gaps are evaluated. Risk and resilience are integrated into all aspects of decision making.
7. Operational Planning	Operational processes based on historical practices but there is awareness of opportunities to improve and optimise operational activities.	Operating plans are available for critical operational areas. Operational scheduling is largely based on historic practices with adjustments to planned and unplanned maintenance frequencies based	Operating plans are available for all operational areas. Incident and emergency management plans are in place. Operational support requirements have been reviewed against good practice and are in place, including consideration of critical spares requirements. Trends in planned and unplanned maintenance and renewal activities are analysed and trade-offs	As for core, plus: Operational objectives and intervention levels defined (aligned to AM Objectives) and results analysed to drive improvements. A formal and regularly reviewed operational planning process is in place. Incident and emergency management plans are regularly tested. Optimal planned and unplanned maintenance and renewals programmes are established with analysis of operating cost,	Decision frameworks (e.g., multi-criteria analysis, benefit-cost analysis) are used to prioritise and optimise expenditure across planned and unplanned maintenance and renewals programmes. Continual review and improvement can be demonstrated for all operational processes. Reviews are undertaken after

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
		on experienced staff and contractor knowledge. Operations organisational structure in place and roles assigned.	considered in determining optimal maintenance and renewal frequencies.	asset condition/ performance, risk and asset criticality.	significant events and recommendations are implemented.
8. Capital Works Planning	Capital investment projects are identified during annual budget process. There is awareness of the need for longer-term capital budgeting (evidenced in interviews).	There is a schedule of proposed capital projects and renewal programmes based on historical costs and staff judgement of future requirements. Renewals strategies are verbalised in interviews but are not well documented. CAPEX projects and programmes justified in AMP (high level) and supporting CAPEX database (detail).	Projects have been collated from a wide range of sources (e.g., through reviews of asset performance, growth, risk management and renewal analysis) and are collated into a project register. Projects are tracked (in a project register or similar) through capital planning stages. Short-term capital projects are fully scoped (including options analysis) and cost-estimated. Renewals programme is based on age and limited condition data. The CAPEX programme is prioritised, based on agreed decision criteria, to rank the relative importance of capital projects and programmes.	As for core, plus: A capital delivery / options evaluation framework is in place and used consistently across the organisation. Formal options analysis and business case development has been completed for major projects in the next three years. Long-term major capital projects are conceptually identified, and broad cost estimates are available. A formal prioritisation framework is routinely applied to all capital projects and programmes (utilising a multi-criteria or benefit-cost approach).	As for intermediate, plus: Formal options analysis and business case development has been completed for significant major projects beyond 3 years. Long-term capital investment programmes are derived from advanced decision techniques such as predictive renewal and network modelling which evaluate level of service and cost scenarios.
9. Asset Financial Planning and Management	Financial planning of asset related expenditure is largely an annual budget process, but there is intention to develop longer term forecasts (evident in interviews).	Asset related financial forecasts prepared for period appropriate to asset life expectancies. Financial budgets for separate operational and capital planning expenditure are prepared.	Depreciated replacement cost valuations aligned to asset information used in renewal forecasts. Asset expenditure categories are suitable to enable AM costing / forecasting analysis. Asset-related financial forecasts are aligned to operational and capital planning and forecasting processes. Consequential OPEX for all new assets is included in OPEX forecasts. Asset and corporate long-term financial planning processes are aligned.	As for core, plus: Long-term asset funding options are regularly reviewed and evaluated with consideration of distribution of benefits (user pays), practicality, financial prudence and intergenerational equity. Major expenditure proposals incorporate whole of life costing.	As for intermediate, plus: Advanced financial modelling includes sensitivity testing of assumptions, demonstrable whole of life costing and cost analysis for level of service options. A decision framework enables projects and programmes to be optimised across all activity areas. Formal risk-based sensitivity analysis of financial forecast scenarios is carried out.

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
			Funding strategies are developed and documented.		Asset and financial data and reporting are fully integrated or regularly reconciled.
10. AM Plans (for the Asset Portfolio and Assets)	Stated intention to develop AMPs (evident in responses to interview questions).	A portfolio AMP contains basic information on assets, service levels, planned works and financial forecasts and future improvements. <i>The AMP may not cover all asset types or services, may only have a short-term focus, may be developed in isolation from organisational planning, or may not be otherwise sufficiently mature for the organisation.</i>	Portfolio AMPs contain core content including asset information, levels of service, demand and lifecycle strategies linking to financial forecasts with key assumptions stated. AMPs are aligned with corporate long-term strategic and financial plans and objectives and are signed off by managers. AMP input from relevant teams and stakeholders. Internal and external reviews occur. AMPs are updated in accordance with the AM Policy / SAMP.	As for core, plus: The Portfolio AMP is supported by Asset Class AMPs, where appropriate. AMPs include confidence levels, detailed significant assumptions and associated risks. AMPs are fully integrated with corporate long-term financial planning process and iterations are formally managed. AMPs are periodically updated, discussed and approved by governance and leaders.	As for intermediate, plus: AMPs are managed as a 'live' document and updated when significant changes signalled. Formal review, audit and approvals processes are documented with evidence of implementation.
11. AM People and Leaders	The organisation recognises the benefits of an asset management function within the organisation, but has yet to implement a structure to support it (evident in responses to interview questions).	AM functions are carried out by small groups, but AM is not embedded or coordinated across the organisation.	Regular ongoing AM coordination processes established (e.g. a cross-divisional committee) which support an integrated and consistent approach across the organisation. Position descriptions incorporate the main AM roles and training is made available suitable to those roles. Visible ownership and support of AM by governance and leadership and awareness of AM purpose across most of the organisation (evident through interviews).	As for core, plus: Leadership is involved in AM coordination (e.g. membership on a regular AM Steering Group or separate AM Governance coordination group). An internal AM communications and training plan is in place and being implemented. Roles reflect AM System competency requirements (defined in SAMP or equivalent document) and are defined in all relevant position descriptions. Demonstrable alignment between AM objectives, team and individual responsibilities.	As for intermediate, plus: Formal documented assessment of AM capability and capacity requirements to achieve AM objectives, regularly reviewed and recommendations incorporated into AM Improvement Plan. Governance and Leadership demonstrably fulfils all the requirements of ISO 55001: establishing policy/objectives, resourcing, communicating, monitoring, supporting cross-functional collaboration and promoting continual improvement.

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
12. Asset Data and Information	Asset information is not available. Awareness of need for asset information (evident in responses to interview questions).	Basic physical asset information recorded (e.g. location, size, type), but may be based on broad assumptions or not complete.	Sufficient information to complete depreciated replacement cost valuation (physical attributes, replacement cost and asset age/life) and to manage operational requirements for assets. Asset hierarchy, identification and attribute standards documented and implemented. Metadata held as appropriate. A formal information needs analysis has been undertaken and an Information Strategy and data improvement plan developed. Knowledge of asset criticality and risk supports the regularity of data collection and updating.	As for core, plus: A reliable register of physical, financial and risk attributes recorded. The Information strategy and data improvement programme are being actively monitored and reported. The use of asset information in asset management planning and decision making is reviewed for effectiveness. Documented, systematic and audited data collection process in place based on a formal information needs analysis.	As for intermediate, plus: All asset data is accurate, consistent and reliable and is used to inform both short term and long-term decision making. Information on work history type and cost recorded at an appropriate asset or component level to enable analysis. Systematic and fully optimised data collection programme with supporting metadata.
13 Asset Management Information Systems (AMIS)	Intention to develop an electronic asset register / AMIS (evident in responses to interview questions). A financial fixed asset register may be in place but only captures accounting data.	Asset register capable of recording all core asset attributes – capacity, type, size, material, etc. Asset information reports can be manually generated for AM Plan input. Simple asset database in use (such as spreadsheet or Access database).	Industry-recognised AMIS or asset register system enables hierarchical asset capture and reporting to component level. AMIS enables live tracking of customer requests linked to maintenance tasks. AMIS provides basic AM reporting capability - condition / performance, renewal forecasts, valuations. The AMIS meets most user requirements (functionality, reporting, usability).	Financial, asset and customer service systems are integrated or able to be fully reconciled (to provide a 'single source of truth' for all data). An information systems strategy for asset related systems is implemented and regularly reviewed. AMIS has spatial mapping capability or interface. AMIS captures remote, 'live' data from operators. More automated analysis and reporting on a wider range of information. AMIS provides renewal modelling capabilities using factors such as age, condition, criticality and performance.	All advanced AM functions are available, including asset risk assessment, predictive maintenance and renewal modelling for different level of service scenarios. Availability of 3D models to enable visual integration with data (e.g.: BIM/Digital Twin)
14 AM Process Management	Awareness of need to formalise systems and processes (evident in responses to interview questions).	Simple AM process documentation in place for service-critical AM activities, covers operation, maintenance and renewal activities.	Critical AM processes are identified, documented, monitored and subject to review. There is evidence that these critical AM processes are followed in practice. AM process interfaces with other teams and organisations, are defined and managed.	As for core, plus: All AM processes have been identified and prioritised. AM Process documentation implemented in accordance with the AM System to appropriate level of detail, depending on process criticality (including business process mapping or similar). All internal management systems and cross-departmental processes are aligned and managed.	As for intermediate, plus: AM processes are regularly reviewed and audited, and improvements implemented. ISO certification of processes to multiple standards for large asset intensive organisations. AM System has been assessed and meets the requirements of ISO 55001. Strong integration of all management

AM Function	Aware (0-20)	Basic (25-40)	Core (45-60)	Intermediate (65-80)	Advanced (85-100)
					systems and cross-departmental processes within the organisation.
15 Outsourcing and Procurement	Procurement and service delivery practices are informal. Organisation is aware of different service delivery options (evident in responses to interview questions).	Service delivery and procurement practices clearly documented (internal and external), generally following historic approaches.	Procurement strategy/policy in place. Internal service level agreements (SLA) with the primary internal service providers, and contracts for the primary external service providers, are in place. Contract and SLA performance specifications are aligned to levels of service. Procurement and contract performance management processes are in place and regularly reviewed.	As for core, plus: Risks, benefits and costs of various outsourcing and lease/buy options considered in determining the service delivery approach. Suitably qualified roles manage procurement and contract management processes. Procurement and contract management processes are regularly audited, and improvements identified.	All potential service delivery mechanisms reviewed, and formal analysis carried out to identify best delivery mechanism.
16 Continual Improvement	Recognition of the need for AM improvement process, evident in responses to review questions.	Improvement actions identified and allocated to appropriate staff and progress monitored.	Current and future AM maturity assessed used to identify improvement actions. Appropriate maturity has been defined for each AM function. Identified improvement actions collated from the maturity assessment and other relevant studies and have been prioritised with input from relevant staff and management. Improvement plans identify timeframes, deliverables, resources and responsibilities and are monitored by the AM team. Improvement plans are monitored.	As for core, plus: Formal periodic monitoring of the AM improvement plan is in place with reporting to appropriate levels of the organisation, at frequencies specified in the SAMP or AMP. Major improvement actions are managed within the organisation's project management framework. Evidence of effective change management practices support AM Improvement Plan implementation. A formal audit framework is established.	A regular cycle of audit and maturity assessment is undertaken with actions fed back into improvement planning. KPIs for monitoring the effectiveness of AM improvement plan outcomes are reported.

Appendix two: Organisation types

The table below shows the different types of organisations involved in asset management:

Table 6-1 Organisation types delivering infrastructure services

Organisation Type	Definition
Government department	Public service department or state services departments are government departments that comprise the core public service.
State-owned enterprise	State-owned enterprises (SOEs) in New Zealand are registered companies listed under Schedules 1 and 2 of the State-Owned Enterprises Act 1986. Most SOEs are former government departments or agencies that were corporatised. They are responsible to the Minister of State-Owned Enterprises.
Crown Agent	Organisations that give effect to government policy, such as the NZ Transport Agency.
Autonomous Crown Entity	Autonomous Crown entities (ACE), which must have regard to government policy, such as Te Papa, the national museum.
Independent Crown Entity	Independent Crown entities (ICE), which are generally independent of government policy, such as the Commerce Commission.
Crown Entity Company	Registered companies wholly owned by the Crown, including Crown Research Institutes (CRIs) and a small number of other companies.
State services organisation	Organisations outside the core public service, such as the New Zealand Defence Force.
Crown Research Institute	Crown Research Institutes are corporatised Crown entities charged with conducting scientific research.
Tertiary Education Institute	Tertiary education institutions, including universities, colleges of education, polytechnics, and wānanga.
Regional Council	New Zealand is divided into sixteen regions for local government purposes. Eleven are administered by regional councils (the top tier of local government), and five are administered by unitary authorities, which are territorial authorities (the second tier of local government) that perform the functions of regional councils. [1][2] The Chatham Islands Council is not a region but is similar to a unitary authority, authorised under its own legislation.
Territorial authorities	Territorial authorities are the second tier of local government in New Zealand, below regional councils. There are 67 territorial authorities: 13 city councils, 53 district councils and the Chatham Islands Council. District councils serve a combination of rural and urban communities, while city councils administer the larger urban areas. Five territorial authorities (Auckland, Nelson, Gisborne, Tasman and Marlborough) perform the functions of a regional council and thus are unitary authorities. The Chatham Islands Council is a sui generis territorial authority that is similar to a unitary authority.
Council-controlled organisations	Were formerly known as local-authority trading enterprises (LATEs). Introduced under Sections 6 and 7 of the Local Government Act 2002, they are essentially any company with a majority council shareholding, or a trust or similar organisation with a majority of council-controlled votes or council-appointed trustees, unless designated otherwise. More than one council may be represented in a council-controlled organisation.
Private sector organisations	The private sector is the part of the economy that is not owned or controlled by the government. It includes businesses, non-governmental organizations, and individuals who provide goods and services. Private sector involvement is high in

telecommunications, and in delivery of asset management outcomes through engineering consultancies, and construction companies.

Appendix three: Table of regulations and legislation

The legislation in the table below is not intended to be an exhaustive list, but covers the key areas effecting asset management both directly and indirectly.

Table 6-2 Regulation impacting on asset management

Sector	Regulation	Description
Energy	Commerce Commission	Disclosure requirements for asset management plans, information on assets, practices, and compliance requirements (for example Pressure Vehicle and Cranes, and new Dam Safety regulations from 2024)

Table 6-3 Legislation Impacting on Asset Management

Sector	Legislation	Description
All organisations in New Zealand	Resource Management Act 1991 Resource Management Act 1991 No 69 (as at 13 April 2023), Public Act Contents – New Zealand Legislation	Requires organisations to consider the environmental effects of their activities and seek appropriate resource consents when necessary
	Building Act 2004 Building Act 2004 No 72 (as at 07 September 2022), Public Act Contents – New Zealand Legislation	Governs building construction, maintenance, and safety standards
	Health and Safety at Work Act 2015 Health and Safety at Work Act 2015 No 70 (as at 13 June 2023), Public Act Contents – New Zealand Legislation	Requires organisations to manage risks associated with assets and infrastructure to provide a safe working environment
All lifeline utilities, per Schedule 1 of the CDEM Act 2002.	CDEM Act 2002 Civil Defence Emergency Management Act 2002 No 33 (as at 01 June 2018), Public Act Contents – New Zealand Legislation	Provides the legal framework for civil defence emergency and recovery management, by providing a mandate for recovery managers and by strengthening the requirement to plan for recovery.
	Emergency Management Bill Emergency Management Bill 225-1 (2023), Government Bill Explanatory note – New Zealand Legislation	Bill passing through Parliament to replace the CDEM Act 2002.
Energy	WorkSafe Act 2013 WorkSafe New Zealand Act 2013 No 94 (as at 01 December 2020), Public Act Contents – New Zealand Legislation	Gas and fuel production and storage facilities are Major Hazard Facilities under the WorkSafe Act.

Sector	Legislation	Description
	Fuel Industry Act 2020 Fuel Industry Act 2020 No 60 (as at 05 May 2022), Public Act – New Zealand Legislation	Specific disclosure requirements reported to MBIE and Commerce Commission.
	Financial Sector (Climate-related Disclosures and Other Matters) Amendment Act 2021 Financial Sector (Climate-related Disclosures and Other Matters) Amendment Act 2021 No 39, Public Act – New Zealand Legislation	Requires climate-related disclosures.
Telecommunications	Telecommunications Act Telecommunications Act 2001 No 103 (as at 01 September 2022), Public Act Contents – New Zealand Legislation	Regulates the supply of telecommunications services
Water and Waste	Water Services Entities Act 2022 Water Services Entities Act 2022 No 77, Public Act Contents – New Zealand Legislation	Establishes the Water Services Entities and Drinking Water Regulator.
	Water Services Bill Water Services Bill 314-3 (2020), Government Bill Contents – New Zealand Legislation	Requirements for AMPS and Infrastructure Strategy, levels of service and demand planning, AMMAs and improvement plans.
	Water Services Economic Efficiency and Consumer Protection Bill 2022 Water Services Economic Efficiency and Consumer Protection Bill 192-2 (2022), Government Bill Contents – New Zealand Legislation	Regulates revenue, price and quality.
	Waste Minimisation Act 2008 Waste Minimisation Act 2008 No 89 (as at 28 October 2021), Public Act 43 Waste management and minimisation plans – New Zealand Legislation	Aims to reduce the amount of waste going to landfill and promote recycling and other forms of waste recovery.
	Soil Conservation and Rivers Control Act 1941 Soil Conservation and Rivers Control Act 1941 No 12 (as at 28 October 2021), Public Act Contents – New Zealand Legislation	Makes provision for the conservation of soil resources, the prevention of damage by erosion and to make better provision for the protection of property from damage by floods.
	Land Drainage Act 1908 Land Drainage Act 1908 No 96 (as at 28 October 2021), Public Act – New Zealand Legislation	Sets out duties of Territorial Authorities for the provision and maintenance of drainage schemes
	Transport	Land Transport Management Act 2003 Land Transport Management Act 2003 No 118 (as at 23 February 2022), Public Act Contents – New Zealand Legislation
Railways Act 2005 Railways Act 2005 No 37 (as at 30 November 2022), Public Act Contents – New Zealand Legislation		Promotes the safety of rail operations and consolidates the legislation relating to railways and management of the railway corridor
Land Transport (Rail) Legislation Act 2020 Land Transport (Rail) Legislation Act 2020 No 33, Public Act – New Zealand Legislation		Implements a new long-term planning and funding system for the heavy rail track network owned by KiwiRail

Sector	Legislation	Description
	Civil Aviation Act 1990 Civil Aviation Act 1990 No 98 (as at 28 October 2021), Public Act Contents – New Zealand Legislation	Governs civil aviation system and sets framework for aviation safety, security and economic regulation
	Airport Authorities Act 1966 Airport Authorities Act 1966 No 51 (as at 28 October 2021), Public Act – New Zealand Legislation	Gives airport authorities powers to establish and operate airports.
	Port Companies Act 1988 Port Companies Act 1988 No 91 (as at 30 November 2022), Public Act – New Zealand Legislation	Provide for the formation of port companies to carry out port related commercial activities
Health	Health and Disability Services (Safety) Act 2001 Health and Disability Services (Safety) Act 2001 No 93 (as at 05 April 2023), Public Act Contents – New Zealand Legislation	Specific regulatory framework for private and public health facilities.
	Retirement Villages Act 2003 - Schedule 2 Retirement Villages Act 2003 No 112 (as at 30 November 2022), Public Act Schedule 2 Disclosure statements – New Zealand Legislation	Specifies disclosure requirements for retirement villages.
Community	Public and Community Housing Management Act 1992 – part 10 Public and Community Housing Management Act 1992 No 76 (as at 01 July 2022), Public Act Part 10 Regulatory authority – New Zealand Legislation	Registers and regulates community housing providers
	Public and Community Housing Management (Community Housing Provider) Regulations 2014 Public and Community Housing Management (Community Housing Provider) Regulations 2014 (LI 2014/116) (as at 01 October 2019) 9 Prescribed information – New Zealand Legislation	Information register requirements for community housing providers.
	Residential Tenancies Act 1986 Residential Tenancies Act 1986 No 120 (as at 31 March 2023), Public Act Contents – New Zealand Legislation	Governs the rights and responsibilities of landlords and tenants in residential tenancies.
Education	Education and Training Act 2020 Education and Training Act 2020 No 38 (as at 01 January 2023), Public Act Contents – New Zealand Legislation	Specifies responsibility for managing assets
Government	Cabinet Office Circular CO (23) 9 Investment Management and Asset Performance in Departments and Other Entities CO (23) 9: Investment Management and Asset Performance in Departments and Other Entities - 18 September 2023 - Cabinet Office (dpmc.govt.nz)	Sets out the roles and expectations of investment intensive central government agencies for capital expenditure and asset performance. This includes having an asset management plan.
	Public Finance Act 1989	Sets out requirements for financial reporting, asset valuation, and asset

Sector	Legislation	Description
	Public Finance Act 1989 No 44 (as at 16 December 2022) , Public Act Contents – New Zealand Legislation	management planning for Crown-owned assets.
All local government	Local Government Act 2002 Local Government Act 2002 No 84 (as at 13 April 2023) , Public Act – New Zealand Legislation DIA Local Government Mandatory Performance measures Local Government Policy - dia.govt.nz	Required 10-year LTPs stating levels of service, expenditure requirements and other elements of asset management for a period of ten years. Also requires 30-year Infrastructure Strategy. DIA requires level of service reporting for stormwater drainage, sewerage and the disposal of sewage, flood protection and control works, water supply, and the provision of footpaths and roads

Appendix four: Acronyms and definitions

ACC	Accident Compensation Corporation
AG-4	Auditor-General's Auditing Standard 4
AHFG	Australasian Health Facility Guidelines
AM	Asset Management
AMCF	Asset Management Competency Framework
AMDS	Asset Management Data Standard
AMMA	Asset Management Maturity Assessments
AMMAT	Asset Management Maturity Assessment Tool
AMPs	Asset Management Plans
ASX	Australian Stock Exchange
AT	Auckland Transport
BIP	Quake Centre's Building Innovation Partnership
BP	British Petroleum
CAA	Civil Aviation Agency
CAE	Centre for Advanced Engineering
CAPEX	Capital Expenditure
CCO	Council Controlled Organisation
CCTV	Closed Circuit Television
CDEM	Civil Defence and Emergency Management
CEATI	Centre for Energy Advancement through Technological Innovation
CHA	Community Housing Aotearoa
CHPs	Community Housing Providers
CO(23)9	Cabinet Office Circular Investment Management and Asset Performance CO(23)9
COMCOM	Commerce Commission
CPI	Consumer Price Index
CPP	Customised Price Path
DER	Distributed Energy Resource
DHBs	District Health Boards – replace by Te Whatu Ora Health NZ in 2022
DIA	Department of Internal Affairs
DOC	Department of Conservation
DPMC	The Department of the Prime Minister and Cabinet
DPP	Default Price-Quality Path
DR	Demand Response
DRC	Depreciated Replacement Cost
EA	Electricity Authority
ECNZ	Electricity Corporation of New Zealand
EDB	Electricity Distribution Business
EEA	Electricity Engineers' Association
EECA	Energy Efficiency and Conservation Authority
EM	Emergency Management
EPA	Environmental Protection Agency
EPR	Electricity Price Review
EPRI	Electric Power Research Institute
ESA	Electricity Supply Authority
ETS	Emissions Trading Scheme
EV	Electric Vehicle
FARs	Funding Assistance Rates

FMANZ	Facilities Management Association of New Zealand
GFMAM	Global Forum on Maintenance and Asset Management
GHG	Greenhouse Gas
GIC	Gas Industry Corporation,
GIC	Gas Industry Company
GPG	Government Property Group
GPS	Government Policy Statement
GW	Gigawatts
GWh	Gigawatt-hour
GWRC	Greater Wellington Regional Council
HASWA	Health and Safety at Work Act
HUD	Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development
HVDC	High Voltage Direct Current
IAM	Institute of Asset Management
ICP	Installation Control Point
ICR	Investor Confidence Rating
ICT	Information Communications Technology
IDS	Infrastructure Decision Support
IEA	International Energy Agency
IFRS	International Financial Reporting Standards
IIMM	International Infrastructure Management Manual
IIMM AMMA	International Infrastructure Management Manual Asset Management Maturity Assessment
IPWEA	the Institute of Public Works Engineering Australasia
IRRS	Income-Related Rent Subsidy
ITF	OECD International Transport Forum
KW	Kilowatt
KWh	Kilowatt-hour
LAFS	Local Authority Financial Statistics
LAMPs	Lifecycle Asset Management Plans
LFCs	Local Fibre Companies
LGA	Local Government Act
LGNZ	Local Government New Zealand
LINZ	Land Information New Zealand - Toitū Te Whenua
LRMC	Long-Run Marginal Cost
LTMA	Land Transport Management Act 2003
LTPs	Long-Term Plans
MAIHI	Māori and Iwi Housing Innovation Framework for Action
MBIE	Ministry of Business Innovation and Employment
MfE	Ministry for the Environment
MIPS	Major Infrastructure Providers
MoE	Ministry of Education
MoH	Ministry of Health
MoJ	Ministry of Justice
MoT	Ministry of Transport
MW	Megawatts
MWh	Megawatt-hour
NAMP	National Asset Management Programme
NAMs	National Asset Management Steering Group
NCCRA	National Climate Change Risk Assessment

NCG	Natural Gas Corporation
NEMA	National Emergency Management Agency
NLTF	National Land Transport Fund
NLTP	National Land Transport Programme
NOCs	Network Outcome Contracts
NSS	New Southern Sky
NTU	DIA National Transition Unit
NZ Airports	New Zealand Airports Association
NZDF	New Zealand Defence Force
NZTA	NZ Transport Agency Waka Kotahi
O&M	Operate and Maintain programmes
OAG	The Office of the Auditor General
OECD	Organisation for Economic Co-operation and Development
OFWAT	Office of Water Regulator in the UK
PCBU	Person Conducting a Business Unit under the Health and Safety at Work Act 2015
PHP	Public Housing Plan
PPE	Property, Plant and Equipment
PSC	Public Service Commission
RAB	Regulated Asset Base
RAP	Refinery Auckland Pipeline
RBI	Rural Broadband Initiative
RCAs	Road Controlling Authorities
REG	Road Efficiency Group
RIMS	Roading Improvement Management System
RMA	Resource Management Act
RMMAT	EEA Resilience Management Maturity Assessment Tool
RNIP	Rail Network Investment Programme
RTLPS	Regional Land Transport Plans
SAIDI	System Average Interruption Duration Index
SAIF	System Average Interruption Frequency Index
SAM+	Self-Assessment Methodology+
SAMP	Strategic Asset Management Plan
SME	Specialist Military Equipment
SMEs	Subject Matter Experts
SOE	State-Owned Enterprise
TCF	NZ Telecommunications Forum
TEC	Tertiary Education Commission
TEFMA	Tertiary Education Facilities Management Associations
TEI	Tertiary Education Institution
THA	Tāmaki Housing Association
TPM	Transmission Pricing Methodology
UFB	Ultra-Fast-Broadband
UK	United Kingdom
UN	United Nations
WACC	Weighted Average Cost of Capital
WasteMINZ	Waste Management Institute of New Zealand
WMA	Waste Minimisation Act 2008
WOSL	Wiri Oil Services Limited WOSL
Z	Z Energy

Term	Definition
“Three” waters:	Public water supply, wastewater, and stormwater.
Asset condition	The asset condition defines the physical state of the asset at this moment in time and helps inform useful life remaining, maintenance interventions, replacements, and other asset decisions.
Asset improvement plan	A plan to present management knowledge, practice and documentation against good asset management practices, and to identify gaps and ways to close them.
Asset management benefits:	Strong governance and accountability, effective lifecycle decision-making, enhanced customer service, improved risk management, financial sustainability.
Asset management maturity:	A process to determine the appropriate level of advancement (maturity) of asset management practices. Undertaking an assessment helps highlight areas where an organisation might invest to lift capability to appropriate levels of maturity and should be used as an input into future improvement planning and monitoring work.
Asset management plan:	An AMP documents intended capital and operational programmes for its new and existing infrastructure, based on the organisation’s understanding of demand, customer requirements, and the state of its asset portfolio.
Asset management policy:	Objectives and principles that will guide asset management in an organisation.
Asset management strategy:	A high-level, comprehensive action plan that guides how assets across the organisation will be managed over time to ensure meeting the organisation's objectives.
Asset management system (ICT solution)	The asset management information system – or asset information in general – provides relevant information to all asset management stakeholders and facilitates better coordination between them.
Asset management system:	Defined and documented asset management processes that are managed within a quality system
Asset management:	The coordinated activity of an organisation to realise value from assets (ISO 55000). The systematic and coordinated activities and practices of an organisation to optimally and sustainably deliver on its objectives through the cost-effective lifecycle management of assets (IIMM).
Asset monitoring:	The process of reviewing and reporting on asset performance.
Asset performance:	The use of metrics and indicators to identify the how assets are meeting the objective and/or expectations.
Asset register:	A database that generates timely, relevant, and accurate information on all the assets you own and manage, including their structure and condition
Asset risk:	The potential for financial loss or negative impact associated with the ownership, operation, or investment in specific assets.
Asset:	An asset is an item, thing or entity that has potential or actual value to an organisation.

Term	Definition
Co-funding:	Where one or more entity funds part of an asset or investment in exchange for service or ownership rights.
Critical assets:	Assets that have a high consequence of failure with potentially significant consequences to societal wellbeing.
Customer:	The user of an asset or service.
Deferred maintenance:	Maintenance that should have been performed but was not undertaken as planned. It is a liability as it means that an asset will not achieve its design service life
Demand (of an asset):	A measure of how much customers use the services provided by the assets, i.e., clean water supply or sewage disposal over time. The ability to consistently predict demand helps governments plan and meet that demand. It also helps manage the impact and consequence (risk) of not meeting it.
Depreciation:	Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life.
Environmental, social, and governance (ESG) sustainability:	ESG refers to a set of criteria used by investors and organisations to evaluate a company's or investment's impact on the environment, society, and its governance practices.
Financial sustainability measures:	Measures or ratios that indicated whether the asset owner has the financial capacity to fund projected asset renewals or replacements as required in the future.
Forward works programmes:	Plans outlining scheduled projects, initiatives, or maintenance activities that an organisation intends to undertake in the future.
Funding mechanisms:	The methods and sources through which an organisation finances its activities, projects, or operations. This could include service charges, rating, government funding, debt.
Funding policies:	The guidelines and rules established by an organisation to govern the allocation, management, and utilisation of financial resources. These policies define the criteria for obtaining funds, specify how funds should be distributed, and outline the conditions for repayment or usage.
Governance:	The system of rules, practices, and processes by which an organisation is directed, controlled, and managed. It encompasses the relationships between various stakeholders and defines the distribution of rights and responsibilities among decision-makers. Good governance ensures accountability, transparency, and ethical conduct within an organisation.
Hazard:	Something that may cause, or contribute substantially to the cause of, a utility performance failure.
Infrastructure:	A system of inter-connected physical structures that employ capital to provide shared services to enhance wellbeing (NZ Infrastructure Strategy).
Levels of service:	Levels of service are the means of defining the outcomes and outputs that customers can expect from asset-based activities, measured through achievement of defined performance measures and targets.

Term	Definition
Life cycle management:	A pillar of the asset management framework involving the set of specific activities implemented to manage an asset during all phases of its life cycle
Life cycle:	The series of stages in the management of an asset, including planning, acquisition, use and operation and its eventual disposal. The life cycle cost of an asset is the total of all costs incurred throughout the phases.
Major infrastructure providers:	The organisations that have overall accountability for the ownership and management of assets that deliver infrastructure services. The criteria for defining which organisations are major infrastructure providers is yet to be determined.
Metadata:	Descriptive information about data. It provides context, meaning, and characteristics of data, making it easier to discover, understand, and manage. Asset metadata includes details such as the creation date, updates to data, data sources (such as desktop or comprehensive condition assessments).
Mitigation strategies:	Proactive measures and actions taken to minimize or prevent the negative impacts of risks and challenges. These strategies aim to reduce the severity or likelihood of adverse events, ensuring more resilient and secure services.
Objective of asset management:	To meet a required level of service in the most cost-effective manner, through the management of assets for present and future customers (IIMM).
Predictive maintenance:	Planned or predicted (based on asset health modelling) repairs or maintenance of assets or asset components.
Rating (rates):	General rates, uniform annual general charges and targeted rates under the Local Government (Rating) Act 2002 .
Reactive maintenance:	Responding to an issue once it has already failed or has fallen into a state of disrepair.
Regulatory frameworks:	Established structures of rules, regulations, and guidelines set by government authorities or other governing bodies to oversee and control specific industries, activities, or sectors. These frameworks aim to ensure compliance, protect public interests, and maintain standards within the regulated domain.
Renewal expenditure:	The capital expenses incurred to restore, replace, or upgrade existing assets, infrastructure, or facilities. This type of expenditure is typically associated with maintaining the operational effectiveness and longevity of assets.
Resilience:	<p>The state of being able to avoid utility supply outages, or maintain or quickly restore service delivery, when events occur. Note: It is sometimes helpful to distinguish:</p> <p>‘technical’ or ‘asset-related’ resilience: i.e., the ability of physical system(s) to perform to an acceptable/desired level (and beyond the design event to prevent catastrophic failure) when subject to a hazard event.</p> <p>‘organisational’ resilience: i.e., the capacity of an organisation to make decisions and take actions to plan, manage and respond to a hazard event in order to achieve the desired resilient outcomes. Adaptation by the</p>

Term	Definition
	utility following an outage-threatening event can be an important aspect of resilience.
Risk management:	A systematic process to identify, analyse, evaluate, treat, monitor, and review risks that cannot be reduced.
Service charges:	Service charges are fees or charges levied by a service provider for the delivery of specific services. These charges may be associated with various industries and can include maintenance services, administrative costs, or other service-related expenses. In the context of property management or homeowners' associations, service charges may cover amenities, utilities, or maintenance of shared spaces.
Stakeholder engagement:	Involving and communicating with stakeholders to understand their perspectives, gather input, and build relationships.
Stakeholder:	A stakeholder is an individual, group, or organization that has an interest or concern in the activities, decisions, and outcomes of another entity. Stakeholders can include employees, customers, investors, suppliers, government agencies, and communities, among others.
Strategic planning:	The systematic process of defining an organisation's direction and making decisions on allocating its resources to pursue this direction. It involves setting goals, assessing the internal and external environment, and developing strategies to achieve long-term objectives. Strategic planning is a dynamic and iterative process that helps organizations adapt to changing circumstances and position themselves for success.
Valuation:	Techniques and inputs used to measure the fair value of assets.

Appendix five: References

Note that the references below refer to sources in the body of this report. Separate references are included in each of the 23 sub-sections in Appendix six.

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Appendix six: Sector assessments

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Appendix six: Sector assessments

Overview

The key sectors (and sub-sectors in brackets) are:

- energy (electricity, gas, liquid fuels)
- telecommunications
- water and waste (three waters, river control and flood protection, irrigation)
- transport (local roads, state highways, rail, air, sea)
- health (public, private)
- community (social housing, community buildings, parks and open spaces)
- education (primary and secondary, tertiary)
- other sectors (defence, land and forestry, justice).

This appendix includes a review of asset management for each of the 23 infrastructure sub-sectors considered in this report. Infrastructure providers need effective asset management practices to help decision-makers balance cost, risk, and service level for assets that provide a service. This appendix examines the sector and organisational settings that influence asset management effectiveness and makes recommendations for improvements. The recommendations included in this appendix are sector specific and should be read in conjunction with broader recommendations in the main body of this report. The eight key recommendations in the main report are identified for relevance in each sub-sector section. Section 5.3 of the main report has a summarised view of key recommendations relevance to the 23 sub-sectors.

The assessments in this report are based on the writers' knowledge of the sectors, publicly available information, and additional information that organisations were willing to share (for example, their own maturity assessments). This information was supported by interviews with select organisations and sector representatives. This study did not attempt to undertake organisational asset management maturity assessments where they did not exist. There are limitations to the report given the breadth of the sectors and the lack of publicly available information.

The assessments of asset management maturity were undertaken in late 2022 and early 2023, and do not reflect any changes since then. More detail on the assessment methodology is in section 2.6 of the main report.

This appendix is intended as a "first pass" to identify relative asset management maturity at a sector level and to identify recommendations to improve asset management and the state of existing infrastructure in New Zealand.

This report reflects the structures of the sectors as at the end of 2023. Subsequent structural and policy changes, for example the disestablishment of Te Pūkenga and the Māori Health Authority, and the discontinuation of Three Waters reform, are not reflected. These changes had not had a material impact on the underlying levels of asset management at the time of writing this report. The effect of previous reforms implemented up to 2023 is included in our assessment, but we do not comment on potential effects of current or planned reforms on future asset management maturity.

1. Energy: Electricity

Electricity sector overview

New Zealand’s electricity network comprises generation, transmission, distribution, and operation assets as illustrated in Figure 1. The varied ownership models are detailed in the New Zealand Infrastructure Commission, Te Waihanga, Energy Sector State of Play¹.

Electricity supply is recognised as the most critical infrastructure service in New Zealand underpinning the operation of the economy and with all other infrastructure services reliant on it to some extent. The *National Vulnerability Assessment* identifies core parts of the transmission grid and major generation schemes as critical national infrastructure.

Transpower (electricity transmission) is subject to price-quality regulation alongside 16 Electricity Distribution Businesses (EDB). Transpower and all 29 EDBs are required to publicly disclose a wide range of information for public scrutiny and Commerce Commission analysis, i.e., information disclosure regulation. This incentivises good asset management practices. The ‘burning platform’ that initiated this regime was major and prolonged electricity disruption in the Auckland CBD in 1998, causing significant economic impacts. Over the last twenty years, and since the introduction of the price quality regulation in 2014, the sector has matured significantly, but it has been a long journey to this point and there are lessons that can be shared with other sectors.

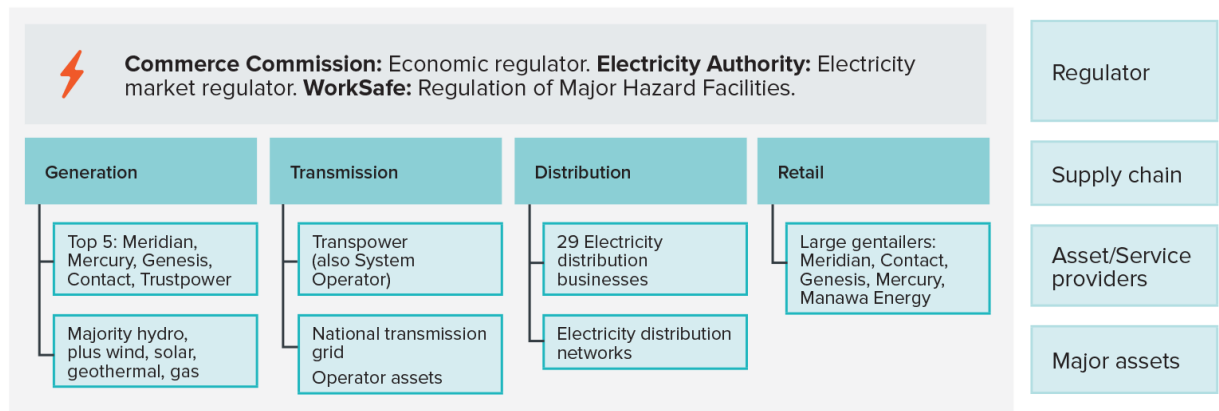
Sector players

The **Electricity Authority (EA)** is an independent Crown entity responsible for the governance and regulation (outside of the Commerce Commission role) of New Zealand’s electricity industry.

The **Commerce Commission** regulates the revenue and quality of both Transpower and EDBs’ assets, undertakes information disclosure regulation and has the power to prosecute for non-compliance with regulatory requirements. It is also the primary competition and fair-trading agency in New Zealand.

The main **Generators** provide electricity into the national grid and manage significant national assets. Most are ‘Gentailers’ and operate a retail arm selling electricity to customers (the retail function is not within scope of this report). Around 1000MW of generation capacity is not connected to the national grid.

There are also several independent electricity retail-only businesses operating in New Zealand. These are not shown in



¹ Infrastructure Commission, Te Waihanga: [Te Waihanga Sector state of play: Energy , Section 4.1](#)

Figure 1 and are not included in this assessment as they are not large infrastructure asset-owning businesses.

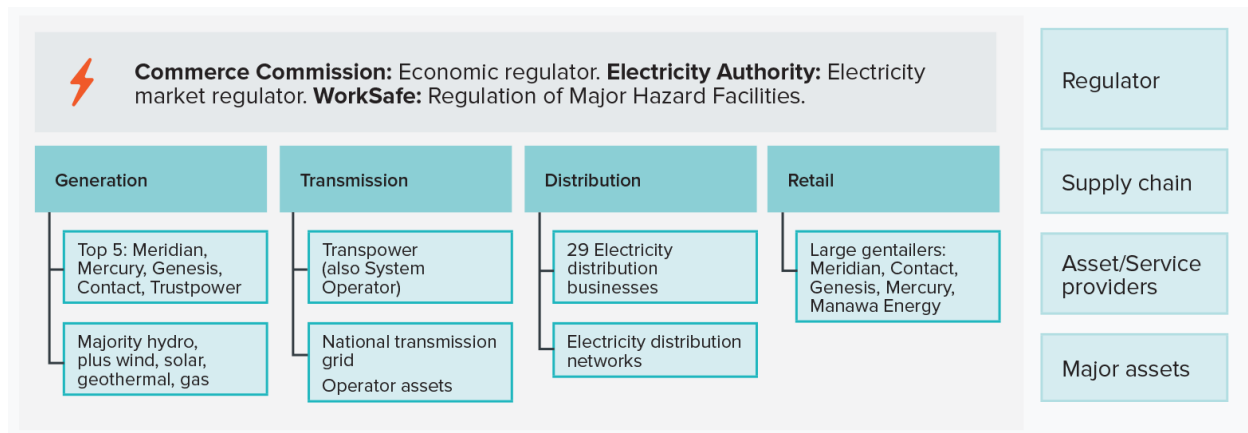


Figure 1: Sector players, Electricity

Transpower manages the national transmission grid which moves bulk electricity from generation sources to large consumers and distribution networks. It is also the System Operator, balancing demand and supply to achieve a stable national network. Generation companies oversee the quality and capacity of generation assets connected to the national grid.

The **EDBs** take supply from the national grid at 'Grid Exit Points' and distribute to customers in their area of jurisdiction through their distribution networks. Additional electricity comes from distributed generation.

Infrastructure asset performance

Transpower's Service Measures Report in 2022 summarises the quality and performance of Transpower's transmission assets. There has been an improvement in service performance over the long term, with reductions in interruptions caused by equipment failures and human errors. Transpower has attributed this to asset management improvements in planning for replacements, maintenance regimes, system enhancements and risk mitigations during outages.

Of the eight asset quality categories that the Commerce Commission measures across the EDBs, most are judged to be of satisfactory quality, though there are areas of concern such as the high-publicised case of Aurora's poor condition above-ground distribution assets (see Aurora case study opposite). A number of other lines companies have received warnings since then. The Commerce Commission published the *Local Lines Company Performance Trends report 2010-2021*², which shows overall reasonably constant reliability over that period.

Generation companies are not subject to the same asset information disclosure requirements as Transpower and the EDBs, and there is less publicly available information on generation assets. However, as players in a competitive market, they are strongly

Dunedin-based lines company Aurora Energy was penalised by almost \$5 million for contravening its network quality standards through an excessive level of power outages. Poor performance in 2016 and 2017 resulted in the Commerce Commission taking Aurora to the High Court for contravening its price-quality path. Aurora's historic under-investment in asset maintenance and renewal were cited as causing a material deterioration in Aurora's service quality.

[Commerce Commission - Aurora Energy Limited \(comcom.govt.nz\)](https://www.comcom.govt.nz/aurora-energy-limited)

² [Commerce Commission - Trends in local lines company performance \(comcom.govt.nz\)](https://www.comcom.govt.nz/trends-in-local-lines-company-performance)

incentivised to undertake good asset management to maximise generation efficiency, output, and reliability. Furthermore, Transpower in its role as System Operator requires data on all generation assets connected to the grid and the EA compiles information on the average age of generation assets.

Sector challenges

Climate change adaptation and mitigation: The Government’s policy commitment to be carbon net zero by 2050 is expected to see transformational change in the sector, with electricity’s contribution to national energy demand increasing from 25% to 60%, while navigating a clear path through New Zealand’s renewable energy transition.

The proliferation of smaller, more distributed, renewable energy sources is changing the overall generation picture. Transpower’s Net Zero Grid Pathways³ program looks at the system-wide requirements and dependencies that will enable new generation to connect to the grid, accommodate both new and growing customer load bases, move power to where it’s needed, and continue to provide a secure and reliable power system. Adaptation to climate-related risks to physical infrastructure will be a challenge, with the National Adaptation Plan requiring Transpower to develop and implement a Transpower Adaptation Plan for climate related risks.

Imperative for better demand forecasting: There is a high degree of uncertainty in future electricity demand from consumers due to causes such as the rate of Electric Vehicle (EV) uptake, the impact of electricity demand as other major users’ transition from non-renewable sources such as gas, and the impact of high electricity demand from new, large data centres. Electricity network operators need to have robust demand forecasts, including scenario planning against key assumptions. There has been a lot of debate around different demand modelling approaches and the projected growth of electricity demand, and the extent to which demand management might play a part in balancing supply and demand.

Seasonal generation capacity: The majority of New Zealand’s electricity comes from hydro generation, and ‘dry winters’ which fail to replenish hydro lakes are a key resilience issue. Increasingly, distributed renewable generation sources do not necessarily provide consistent supply, as many are weather-dependent as well (overall around two thirds of electricity generation is weather-dependant). The government is also considering large scale mitigations such as pumped storage hydro schemes.

Network resilience: The long distances between generation and demand sources means the consequence of failures in the national grid (as may be expected in many major disaster scenarios) are high. Transpower and EDBs have invested in seismic upgrades and other mitigations, and continue to apply new standards to any new designs and installations. Some sector participants argue that high impact, low probability risks are difficult to get funding for under the default price-quality pathway (DPP), however it is up to each EDB to prioritise projects within their fund allocation.

EDBs can opt into a customised price-quality path (CPP) approach if funding under DPP is considered inadequate. Transpower is on an individual price-quality path (IPP) and, following systematic resilience reviews across multiple hazards, is seeking a significant increase in proactive resilience investment in its next five-year plan (2025-2030).

Cyclone Gabrielle highlighted the high level of business and community dependence on electricity, and the cascading failure impacts across telecommunications, water, fuel, and other sectors. The Government has committed more funding to improve resilience across all infrastructure sectors, through a multi-billion-dollar recovery fund.

³ [Net Zero Grid Pathways | Transpower](#)

Skills shortages: The industry is likely to become increasingly fragmented, with distributed energy resources and other factors. This makes oversight of the sector's skills requirements difficult. The Electricity Engineers' Association (EEA) notes that many organisations find preparing competency frameworks is difficult and there seems to be lack of recognition of asset management qualifications.

Information governance and management: Feedback from organisations seeking asset management certification is that information governance and management is challenging to address (such as information needs assessment and cost-benefit analysis, and defining and monitoring information quality).

Electricity asset management drivers

Legislation and regulation

As monopoly industries, Transpower and the EDBs operate under prescriptive and detailed information disclosure requirements set by the Commerce Commission. Asset Management Plans (AMPs) are made publicly available and are reviewed periodically by the Commerce Commission, with 'deep dives' into areas of concern as required (for example, the review of EDB risk practices arose from the Aurora situation). The Asset Management Maturity Assessment Tool (AMMAT) requirements were developed by the Commerce Commission in 2011 and became part of the information disclosure requirements.

The CPP allows more flexibility in pricing and funding where need is demonstrated through robust evidence. The 2018/19 Electricity Price Review⁴ gave consideration to mandating the CPP for EDBs, but instead recommended that the largest EDBs could be subject to an IPP like Transpower. The Commerce Commission supported this recommendation at the time.

The generation sector is competitive and does not fall under the same price-quality regulation as EDBs and Transpower. However, along with the competitive drivers, the whole electricity sector has significant compliance requirements, which are largely safety driven, such as specific electrical asset regulation for pressure equipment, cranes, and passenger ropeways. These regulations, while focussed on safety, have relevance to asset management practices such as condition monitoring and risk assessments. Transpower also monitors the quality of generator performance as a requirement of connecting to the National Grid.

The Minister can request the EA to undertake an inquiry into any matter, including asset management practices. This happened following the Penrose substation fire in 2014, and several recommendations were made to Vector relating to improved asset management.

Industry guidance

The EEA is active in supporting asset management maturity in the industry and produces guidelines and training packages. The EEA developed guidelines and tools to support AMMAT, which are used to self-assess and report asset management maturity in the publicly disclosed AMPs. The AMMAT guidelines appropriately allow for different levels of target maturity given the wide range in sizes of electricity distributors and generators.

It has also produced *Asset Information Maturity Guidelines*, a *Resilience Guide* and an *Asset Criticality Guide*. The uptake by EDBs using the Resilience Guide and Resilience Maturity Assessment Tool to drive improvements in this area has been anecdotally noted as slow, but Cyclone Gabrielle has spurred interest in this area.

⁴ [2018-2019 Electricity Price Review | Ministry of Business, Innovation & Employment \(mbie.govt.nz\)](#)

Some sector participants also contribute to industry groups, such as the Centre for Energy Advancement through Technological Innovation and the Electric Power Research Institute as a means of networking, learning, and keeping up with best industry practice.

Electricity sector asset management maturity

Transpower is required to disclose a self-assessed AMMAT every two years, and EDBs twice every five years, as part of their AMPs (an example of an EDB AMMAT is shown in Figure 2). These are largely based on self-assessments, though many EDBs do have external audits undertaken.

A sector view of asset management maturity, formed by mapping AMMAT results against the IIMM maturity assessment elements (AMMA), is presented in Table 1. This is largely based on analysis of a sample of AMMAT disclosure information from the transmission and distribution sectors, supported by sector interviews.

It is emphasised that the self-assessment process has limited reliability, particularly for lower maturity organisations who tend to overscore, because 'they don't know what they don't know'. As organisations mature, they better understand the requirements and score themselves harder.

The Commerce Commission has completed several targeted sector reports, reviewing specific areas of asset management, which are available on their website. The Commerce Commission completed and published a review in April 2024 on resilience in AMPs.

Through a process of consolidating a sample of EDB and Transpower AMMATs in their most recent AMP and disclosure documents, observations include:

- Most EDBs score between 2.5 and 3 out of 4 for most functions (3 is the target scores for most); this generally aligns with 'core-intermediate' under the AMMA framework.
- Asset data controls, auditing, risk management and continual improvement are the lowest scoring functions in the AMMAT results, with many scores of 2 or 2.5 out of 4, meaning practices are still developing.
- While the scores shown in Table 1 are averaged across a sample of EDBs and Transpower results, it is noted that Transpower sits at the higher end of the maturity range, with intermediate scores across most categories.

There was no available asset management maturity information for generation companies. However, an interview with one participant indicates mature lifecycle planning processes, with individual asset strategies driving maintenance programmes, and asset lifecycle curves adjusted for actual condition and performance results. The organisation was maturing in its journey from opinion-based to evidence-based investment planning, and frequency-based to condition and performance-based interventions.



Figure 2: Example of AMMAT results for an EDB

The distribution sector will have more players and participants operating in it, with two-way power flows, and will be more distributed in nature (for example, customers undertaking demand response to spot pricing, parties installing distributed energy resources). A key asset management challenge for the distribution sector is to ensure that these other parties have good asset management practices such as maintaining the network integrity for when things go wrong, having good visibility of network information and demand response that will respond when requested, as they will be increasingly relied upon. An overall summary of sector maturity is presented in Table 1.

Asset management function	Maturity	Overview of current practice
Strategic direction	Intermediate	Asset management policies are in place for all EDBs, though some are out-of-date and not well socialised (though AMPs are signed off by Directors each year). Strategy-AMP alignment is good, and strategic AMPs are increasingly being developed as many EDBs seek to align with ISO 55001.
Levels of service	Intermediate	EDBs and Transpower required to report and achieve a number of KPIs relating to system outages. The 2020 <i>Review of EDB target areas for improvement</i> identified several improvements relating to reliability and interruptions reporting. Generator performance reporting is focused on ability to meet capacity needs. Specific consumer engagement over levels of service and price is mainly with large customers, but EDBs do undertake customer surveys to identify improvement initiatives.
Demand	Core	Transpower and EDBs develop demand forecasts at Grid Exit Points. Historically these have largely been based on Statistics' population forecasts, but the sector is developing scenario-based forecasts factoring in key demand drivers and uses modelling to assess impacts on the networks. Demand management is incentivised through pricing (on and off-peak), enabling distributed generation by consumers, and other levers.
Evidence	Core	Asset registers are in place and key asset information (asset health/age) is required to be reported to the Commerce Commission. Capturing reliable data from the field has been a challenging process, though the Commerce Commission is seeing improvements in asset health reporting. EDBs and Transpower provide annual evidence and disclosure reporting on asset condition, age and performance. The <i>Review of EDB target areas for improvement</i> identified many issues relating to the capture of asset history / interruptions.

Asset management function	Maturity	Overview of current practice
Risk	Core	A Commerce Commission review of EDB AMP Risk Preparedness in 2019, found that all EDBs had implemented a form of risk policy and framework and participate in Lifelines Group activities. However, it noted the need for improvements in the assessment and strategies applied to high-impact, low-probability risks, and more rationale for the need for resilience investments (particularly funding for 'just in case' assets). The EEA Resilience Management Maturity Assessment Tool has been completed by all EDBs.
Operational planning	Core	EDBs all have emergency response plans in place, through many are not regularly tested or reviewed. All orgs have planned maintenance programmes and reactive maintenance strategies; however, most are still working to develop data-driven operate-and-maintain programmes. The <i>Review of EDB target areas for improvement</i> highlighted vegetation management as a key focus area.
Capital planning	Intermediate	Capital programmes are required as part of the AMP disclosures and price regulation by Commerce Commission. The CPP allows more deviation from historic budgets if justified (this has been used by Wellington Electricity and Orion to secure additional resilience funding, and more recently Aurora moved to a CPP to enable funding to address performance issues).
Financial forecasts	Intermediate	As above. Under the DPP model, forecasts are based on a mix of EDBs' own forecasts and trends from 'what was spent before' + CPI'. Bottom-up (data driven) maintenance and renewal forecasts are increasingly available.
Asset management plans	Intermediate	AMPs are required to be disclosed every two years with an annual update and Commerce Commission. These have historically been large documents, driven through the need to include disclosure requirements and to make them a comprehensive working document; but the sector is generally working towards more user-friendly plans with key information easier to access. The journey to develop AMPs has taken time, however across all EDBs they are now good, with many EDBs now having 55000 certification.
People	Core	Capability and capacity constraints, due to the ageing workforce, competition with other sectors and countries for AM professionals amongst other matters. However, leadership direction and monitoring and cross-organisational asset management coordination are generally good, with asset management seen as core business by electricity companies.
Service delivery	Core	Most physical works are outsourced through competitive tendering processes, though some specialist activities are undertaken in-house.
System and improvement	Basic	A number of EDBs have certification to ISO 55001, however, auditing and improvement were rated as lower areas of asset management capability, with some EDBs scoring only a 2 out of 4.

Table 1: Asset management maturity, Electricity sector

Electricity sector funding

The following is summarised from the *Energy State of Play*:

- Transpower collects most of its revenue from its customers in accordance with a transmission pricing methodology approved by the EA, and the maximum allowable revenue is set by the Commerce Commission for five-year periods using IPP. The EA provides funding to Transpower for its System Operator role.
- The Commerce Commission sets the maximum allowable revenues for five-year periods for the 16 EDBs subject to price-quality regulation, most under a DPP regime, and Aurora is in year three of a CPP
- A CPP mechanism is available if an EDB needs to invest more in network assets than revenue limits under their DPP.
- The remaining 13 consumer-owned EDBs are exempt from price-quality regulation, though they are subject to the same information disclosure regulation as other EDBs.

Generation companies largely govern their own funding decisions, and prices are established through generation market mechanisms.

Recommendations for electricity sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Energy: Electricity
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Currently many agencies have a role in defining infrastructure asset management requirements for MIPS.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is already in place for Commerce Commission regulated organisations, less clear for generation sector.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: AMMAT information is buried in disclosure documents, largely self-assessed.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Electricity is well advanced in reliability monitoring, but room for improvement in underlying asset data.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: AMPs are widely in place and progressing on a maturity journey.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Energy: Electricity
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Electricity services are highly critical and there is frequent debate about the extent to which funding rules enable investment for wider community benefit.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time).

The electricity sector has already implemented many of the key recommendations in this report to some extent. It is also noted that there is a significant amount of regulatory reform already happening, relating to climate change adaptation, critical infrastructure resilience and emergency management (refer to Section 4.5). This report generally supports the direction of these reforms, but also makes the following specific recommendations relating to asset management practices.

1. Review the information disclosure requirements against the key report recommendations (Section 1.7), such as reporting on financial sustainability ratios and deferred maintenance.
There are several key recommendations made in the main part of the report; for the electricity sector these may be best addressed through modifying existing disclosure requirements.
2. Review the AMMAT framework used for regulatory reporting to encompass all aspects of good practice asset management in ISO 55001, the IIMM, the Āpōpō Guide and EEA Guidance.
The AMMAT tool was developed in 2014, and asset management practices have evolved since then. This review would assist with improving maturity in key areas that are not well covered in the existing AMMAT, such as governance / leadership, demand forecasting, customer engagement, investment planning and infrastructure resilience.
3. Review regulation of asset management practice in the generation sector.
To provide greater transparency of the resilience of critical national infrastructure assets and future supply security, and ensure that the regulation creates the correct incentives for generators to undertake optimal AM.
4. Undertake a targeted review of lower scoring areas of the AMMAT following the next round of AMPs (from the existing AMPs, these areas are asset data controls, auditing, risk management and continual improvement).
This will focus attention on the causes of, and risks associated with, lower maturity in these areas. Risk management and data controls are important functions for managers of critical assets, providing higher assurance that asset health and performance is being well-managed.
5. Encourage EDBs to proactively consider a CPP approach where greater expenditure is required than allowed for by the DPP.

The CPP approach could drive a higher level of asset management maturity through asset-needs-based investment rather than top-down funding envelopes partly based on historic investment and performance.

6. Develop industry guidance / roadmap for improved visibility and monitoring of low voltage networks and scenario-based demand forecasting. This needs to consider the significance of renewable generation connecting into the networks as well as load demand changes.

This is intended to address an identified risk around the visibility of the capacity of the low voltage network to meet changing demand profiles.

Electricity sector reference documents

- Infrastructure Commission, Te Waihanga: *Energy Sector State of Play Discussion Document*.
- Commerce Commission: *Reporting of asset management practices by EDBs A review of target areas for potential improvements, 2020*.
- Commerce Commission: *AMP Review of Risk Management Preparedness, 2019*.
- Transpower *Grid Outputs Report 2019 and 2021, Asset Management Plan 2018*.
- Commerce Commission: *Performance Summaries for Electricity Distributors, 2020*.
- NZ Lifelines Council: *NZ Critical Lifelines Infrastructure, National Vulnerability Assessment 2020 and 2023*.

2. Energy: Gas

Gas sector overview

The gas industry is important to the economy; many large industries, hospitals and some electricity generators are powered by natural gas, as well as the many customers who rely on it for household functions.

New Zealand’s gas network comprises generation, transmission, distribution, and operation assets as illustrated in Figure 3. Natural gas is produced from gas fields in Taranaki, with most of the gas coming from the four largest fields – Pohokura, Mangahewa, Maui and Kupe. Gas is piped to onshore production stations, and from there, condensate (liquid fuel) is piped to the Omata Tank Farm for shipping to offshore refineries.

The tank farms and main north-south transmission line supplying Hamilton, Auckland and Wellington are critical national infrastructure assets. The Maui gas pipeline leak in 2011 caused by landslide movement was estimated to have cost the economy \$200 million.

Sector players

The main sector players are:

- **OMV and Todd Energy** are the two largest gas producers and processors own both on- and off-shore assets including the major tank farms.
- **First Gas** manages the gas transmission network, piping gas from production facilities in Taranaki to demand points across the North Island, as well as being a gas distributor to some areas.
- **Gas distribution companies** (many of which are also EDBs) pipe gas from the transmission network to customers.
- The **Critical Contingency Operator (CCO)** manages major disruptions to the gas demand-supply balance, to maintain a stable gas network.
- The **Commerce Commission** regulates the price-quality of the transmission and distribution businesses, and undertakes information disclosure regulation.
- The **Gas Industry Company (GIC)** is a co-regulator of gas, which oversees gas governance, facilitates gas markets and provides advice.

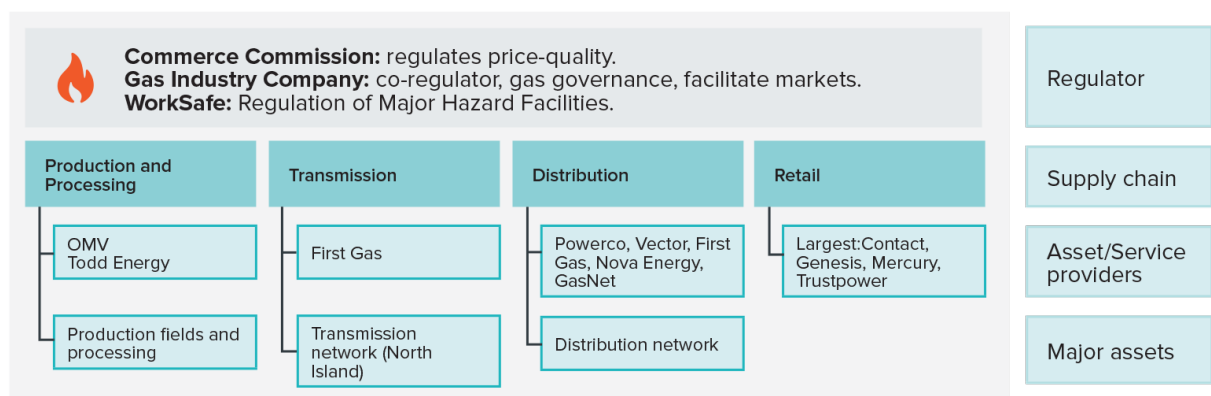


Figure 3: Sector players, Gas

Infrastructure asset performance

Gas transmission and distribution businesses are required to report on asset condition and performance as part of information disclosures. However, there is limited publicly available information across the gas sector.

Sector challenges

Climate change and transition to renewable energy:

The New Zealand Government's Climate Action Plan will require sector transformation as it transitions out of fossil fuels as a major energy source.

A Gas Transition Plan was required by the end of 2023, to achieve the goals of the Climate Action Plan. First Gas (and others) have been trialling biomass and hydrogen fuel mixed in with existing product and is starting to diversify into the electricity generation market.

Uncertain future: Industry participants commented that government direction is needed on the practical aspects of decarbonising the sector – for example, timing of the withdrawal of gas-fired electricity generators will have impacts on the resilience of that sector.

The GIC report into Gas Market Settings in 2022 identifies risks that investment will not occur in needed gas production if there are high levels of uncertainty of demand trajectories. Another key finding was that commercial settings are insufficient to support continued supply of electricity through the transition period.

Gas sector asset management drivers

Legislation and regulation

The gas transmission and distribution sectors are monopolies and are regulated by the Commerce Commission in relation to price/revenue and quality. Information disclosure requirements are prescriptive in respect of requiring detailed AMPs, and information on assets and asset management practices.

The gas production and storage facilities are Major Hazard Facilities under the WorkSafe Act, and must operate within this regulatory framework. This regulation is focussed on safety, but has relevance to asset management practices such as maintaining asset integrity. For example, there are requirements to undertake safety assessments which include consideration of asset failure risks and mitigations, as well as to prepare emergency plans for Major Hazard Facilities.

The following legislation applies to the gas production sector:

- Health and Safety at Work Act 2015
- Hazardous Substances & New Organisms Act 1996
- Crown Minerals Act 1991
- Maritime Transport Act 2004
- Biosecurity Act 1993
- Resource Management Act 1991 (RMA)
- Exclusive Economic Zone Continental Shelf (Environmental Effects) Act
- Electricity Act 1992

A key challenge for asset managers is to maintain the integrity and performance of the assets, while not over-investing in a network that is expected to become increasingly obsolete. A continued gas supply for electrical generators is needed for the electricity market until 2030 (critical for 'dry winter' electricity generation) and longer term for other users as they transition to renewable sources (expected to be through to 2050).

Industry guidance

The GIC provides guidelines for the industry, though not specifically in relation to asset management.

Gas sector asset management maturity

The last external sector-wide review of gas (transmission and distribution) AMPs was in 2015, which found that, overall, the AMPs met the information disclosure requirements. The review did not specifically look at asset management maturity.

A further sector review commissioned by the Commerce Commission was the risk management review of gas pipeline businesses. The results, while having a risk management focus, are highly relevant to asset management maturity and indicate most are operating at an 'intermediate' level (refer to Figure 4).

Self-assessed AMMAT results are reported in AMPs as part of legislated information disclosure requirements. A scan review of selected AMPs appears to confirm that the sector asset management practice ranges from core to advanced levels for different asset management functions. However, as noted in the electricity section, self-assessments have many limitations, one of them being the 'we don't know what we don't know' factor, particularly for lower maturity organisations.

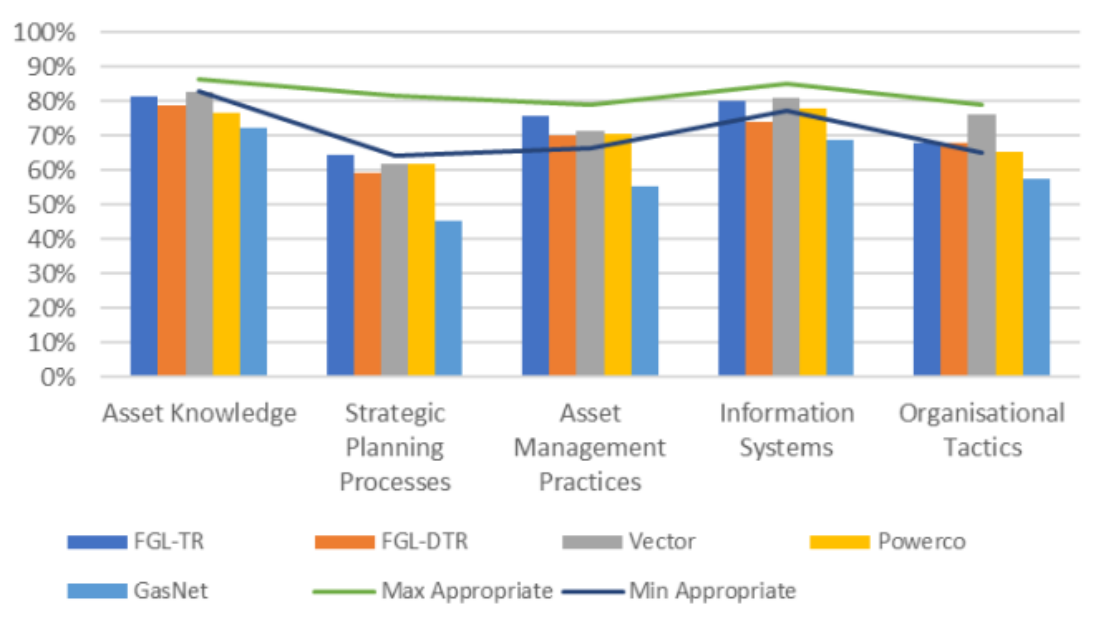


Figure 4: Summary comparison of risk management practices, gas transmission and distribution (2019)

There was no documented available information on asset management maturity in the gas production sector. However, one major gas producer assessed their maturity at '5' out of 5 across all functions, with the following justification:

Petroleum mining in New Zealand is regulated by the Crown Minerals Act 1991, which aims to promote the prospecting and extraction of Crown-owned minerals for the benefit of the country. Annually, developed, undeveloped, and contingent reserves are reported. A Field Development Plan is submitted to New Zealand Petroleum and Minerals for review and approval, while asset performance is assessed annually by the Ministry of Building, Innovation and Employment (MBIE), with input from WorkSafe, the Environmental Protection Agency, and Maritime NZ. Additionally, a Life of Asset Plan and an Asset Reference Plan are developed, both of which are internal and commercially sensitive. The Joint Venture establishes an annual Production Work Program and Budget, along with a Decommissioning Plan that is submitted to MBIE for review and approval. Operations are conducted according to the Joint Venture Operating Agreement and are maintained in compliance with extensive legislation.

An overall summary of sector maturity is presented in Table 2.

Asset management function	Maturity	Overview of current practice ⁵
Strategic direction	Core	Asset management policies are in place for distribution and transmission companies, though some may be out-of-date and not widely socialised. Strategic AMPs are generally not developed and alignment of AMPs to deliver corporate goals and strategies and future demand scenarios is identified as a work-in-progress.
Levels of service	Core	Some performance metrics are required to be reported by Commerce Commission, but there is a desire to review these and establish additional asset performance metrics (for example, compressor reliability and availability) for internal management and reporting and to prioritise asset improvements.
Demand	Core	First Gas, as system owner and operator, is responsible for balancing demand and supply, and annually review demand forecasts and align asset needs. The Critical Contingency Operator manages response to demand shocks.
Evidence	Core	Asset data quality is generally acknowledged as a key area for improvement and data controls is one of the lower performing areas of AMMAT. It is noted that organisations adopting the CPP framework have a much stronger driver for improved asset data to provide evidence to support asset funding requirements.
Risk	Core	Corporate risk frameworks, policies and risk registers are generally established, with 'bottom-up' asset risk analysis starting to be used to inform investment planning. Safety and reliability are a major driver for this sector because a) there is limited redundancy in transmission assets and b) the consequences of failure can be very high.
Operational planning	Core	Planned maintenance programmes are in place, generally based on supplier recommendations with consideration of additional maintenance to address specific performance issues. Some agencies are looking to develop more risk-based optimised maintenance programmes.
Capital planning	Intermediate	Capital programmes are required as part of the AMP disclosures and price regulation by the Commerce Commission, and major projects require business cases.
Financial forecasts	Intermediate	As above. Under the DPP model, there is an emphasis on 'what was spent before + CPI'. Bottom-up (data driven) maintenance and renewal forecasts are increasingly available.
Asset management plans	Intermediate	AMPs are required to be disclosed every three years with an annual update. The AMPs are large and unfriendly documents in many instances, driven through the need to include information to meet regulatory requirements. There is an expressed desire to produce more user-friendly documents.
People	Core	Capability and capacity constraints exist, as with other sectors, due to the ageing workforce, competition with other sectors and countries for asset management professionals amongst other matters. Leadership direction and monitoring and cross-organisational asset management coordination are generally good, with asset management seen as core business by gas companies.
Service delivery	Core	Most physical works are outsourced through competitive tendering processes, though some specialist activities are undertaken in-house.
System and Improvement	Core	Self-reported AMMAT occurs as part of AMP and information disclosures, but there is no evidence of formal monitoring and reporting of an AMP improvement plan. ISO 55001 accreditation being considered by some agencies.

Table 2: Asset management maturity, Gas sector

⁵ For the transmission and distribution sectors – gas production companies did not respond to invitations to participate.

Gas sector funding

Funding is via user-pays charges, with revenue limits regulated by the Commerce Commission. As per the electricity sector, organisations can choose to adopt the DPP or CPP regulation.

Recommendations for gas sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Energy: Gas
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Currently many agencies have a role in defining infrastructure asset management requirements.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is already in place for Commerce Commission regulated organisations, less clear for generation sector.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: AMMAT information is buried in disclosure documents, largely self-assessed.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Performance reporting occurs, but room for improvement in range of measures and quality of underlying asset data.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: AMPs are widely in place and progressing on a maturity journey.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Energy: Gas
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Gas services are critical and there is frequent debate about the extent to which funding rules enable investment for wider community benefit.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time).

The gas sector has already implemented many of the key recommendations in this report to some extent. There is also a significant amount of regulatory reform happening, relating to climate change adaptation, critical infrastructure resilience and emergency management (refer to Section 4.5). This report generally supports the direction of these reforms, but also makes the following specific recommendations relating to asset management practices.

Further, the GIC has made recommendations to provide supply security through transition that are supported in this report. Some specific additional recommendations include:

1. Review the information disclosure requirements against the key report recommendations, such as reporting on financial sustainability ratios and deferred maintenance.

Currently there is limited transparency of the extent of future asset maintenance and renewal planning, and an associated risk that assets are not being sustainably managed to meet long-term needs.

2. Undertake a targeted review of lower scoring areas of the AMMAT following the next round of AMPs (from the existing AMPs, these areas are asset data controls, auditing, risk management and continual improvement).

This will focus attention on the causes of, and risks associated with lower maturity in these areas. Risk management and data controls are important functions for managers of critical assets, providing higher assurance that asset health and performance is being well-managed.

3. Review the AMMAT framework used for regulatory reporting to encompass all aspects of asset management in ISO 55001 and the IIMM – for example, explicitly include requirements for customer level of service engagement and undertaking demand forecasting scenarios as a basis for capital planning.

The AMMAT tool was developed in 2014, and asset management practices have evolved since then. This review would assist with improving maturity in key areas such as demand forecasting and customer engagement.

Reference documents for gas sector

- Infrastructure Commission, Te Waihanga: *Energy Sector State of Play Discussion Document*
- Gas Industry Co.: *Gas Market Settings Investigation: Report to the Minister of Energy and Resources, September 2021*
- NZ Lifelines Council: *NZ Critical Lifelines Infrastructure, National Vulnerability Assessment 2020 and 2023*
- Gas Industry Company: *Gas Market Settings Review, 2022*
- NZ Commerce Commission: *Review of Gas Pipeline Businesses' Asset Management Plans, 2015*
- NZ Commerce Commission: *Risk Management Review of Gas Pipeline Businesses, 2019.*

3. Energy: Liquid fuels

Liquid fuels sector overview

New Zealand’s domestic liquid fuel demand is met by imported refined fuel shipped to ports around New Zealand. While the country does produce some liquid fuel by-products from the Taranaki gas production process, these are exported to markets requiring the high-quality product.

Sector players

The fuel sector is privatised but is regulated in several areas to ensure security of supply and to align the market with government policy direction. Figure 5 shows the main sector players in the liquid fuel sector.

The sector is dominated by the major companies **BP, Mobil and Z** which own most of the storage and pipelines infrastructure through a range of ownership models. They have part or full ownership in other entities such as:

- Channel Infrastructure, which owns and maintains the Marsden Point Import and Storage Terminal facilities and the Ruakaka to Auckland pipeline.
- Wiri Oil Services Limited, which operates the Wiri and Marsden Point inland terminals and truck loading facilities, and the Wiri-Auckland airport fuel pipeline.

MBIE provides policy direction and oversight of fuel system security.

The **Commerce Commission** enforces the requirements of the Fuel Industry Act and monitors the competitive performance of the fuel markets.

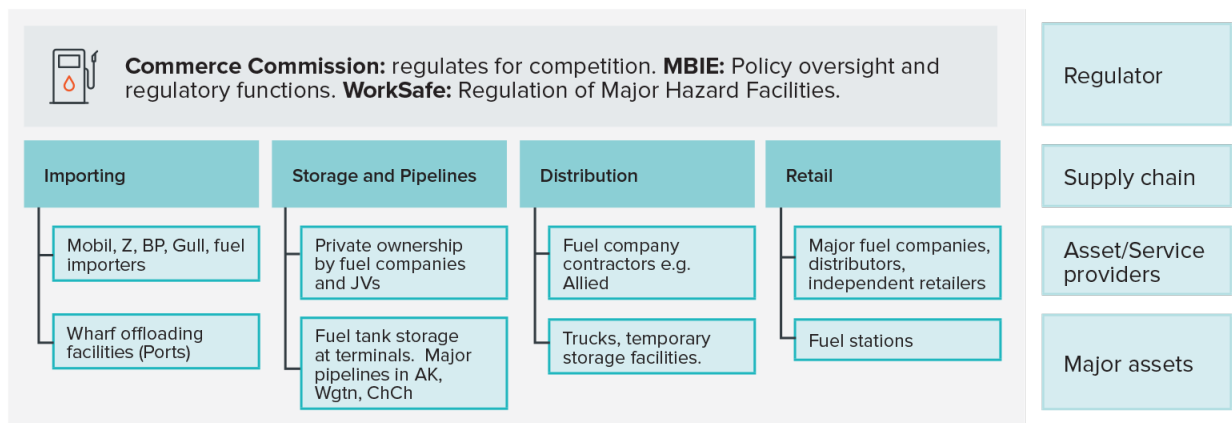


Figure 5: Sector players, Liquid fuels

Infrastructure asset performance

The critical assets in the supply chain include the coastal fuel storage facilities, shown as red dots in Figure 6, and major pipelines supplying airports and cities around the coast.

MBIE undertakes fuel security reviews every few years, targeted at different aspects of the system. Arising from these reviews, the quantity and type of fuel stockholdings in the country has been a concern for many years.

However, beyond this, there is no publicly available information on the condition, reliability, and performance of fuel infrastructure assets.

Sector challenges

Fuel resiliency

The failure of the Wiri-Marsden Pipeline in 2017 caused disruption to Auckland flights (and national and international disruptions) for over a week. This highlighted a known vulnerability relating to jet fuel storage in Auckland in the event of pipeline disruptions.

The closure of the Marsden Refinery in 2022 (and the large crude oil and component storage tanks) saw a significant reduction in national in-country storage, with only five days national demand of refined fuel products stored onshore at Marsden. However, the fuel companies submitted to the government that supply resilience was expected to improve with the closing of the refinery, as there will be more import ships on the water at any one time, providing flexibility to divert stock to where it is needed.

A subsequent government review has resulted in a suite of proposed policy measures called the 'Fuel Resiliency Plan 2022'. This includes mandating minimum stockholdings by fuel importers and wholesalers, expected to come into effect in January 2025.

Climate change action plan

The transition to carbon zero will have a significant impact on the sector, with demand reductions expected, but on a very uncertain trajectory as industry and consumers change to EVs (or other alternative fuels), distributed on-site generation and other renewable solutions.



Figure 6: National fuels supply chain (source: National Infrastructure Vulnerability Assessment, 2022). Note that blue arrows denote fuel shipments; red arrows show general direction of trucked and piped supply from ports.

Planning for an uncertain future is a pressing challenge and, as with the gas sector, there is a delicate balance between maintaining asset integrity and performance while not over-investing in future obsolete assets.

Liquid fuels asset management drivers

Legislation and regulation

The Fuel Industry Regulations 2021 place several information disclosure requirements on fuel industry participants, aimed at helping MBIE and the Commerce Commission to monitor competition in the market. While asset management is not a focus of these information requirements, they do require the disclosure of some information relating to fuel storage capacity and operational storage volumes.

The Fuel Industry (Improving Fuel Resilience) Amendment Bill, which will introduce the minimum stockholding requirements referred to previously, also provides for information disclosure requirements to be put in place relating to fuel resilience.

Fuel storage and pipeline facilities are Major Hazard Facilities and pipelines under health and safety regulations which, while focussed on safety, has relevance to asset management practices such as maintaining asset integrity.

Industry guidance

Major pipeline owners follow Australian pipeline regulations, which includes asset management practices such as lifecycle planning and risk management. For tanks and terminal structures, regulations require the owner to adopt a standard. It is understood the American Petroleum Institute standards are most widely used, which also contain asset management-related requirements.

Liquid fuels asset management maturity

Asset management is not a well-publicised discipline in the liquid fuels sector, and there was no publicly available information on asset management maturity. The results presented in Table 3 should be considered indicative only and are based on interviews with two large fuel asset-owning organisations.

Driven by Health and Safety at Work Act compliance to ensure asset integrity, there are some areas of more advanced asset management practice such as condition monitoring and risk management. However, the development of AMPs and long-term financial forecasts are not a requirement and there is no visibility over the future investment to maintain critical national infrastructure assets.

An overall summary of sector maturity is presented in Table 3: Asset management maturity, Fuel sector.

Asset management function	Maturity	Overview of current practice
Strategic direction	Basic	No visibility of existence of asset management policies or strategic AMPs, though it is understood some fuel industry participants are developing these practices.
Levels of service	Core	While there is limited public disclosure of performance, fuel companies are required to report to MBIE information such as capacity and stockholdings and there are internal KPIs reported to management and Boards. Customer engagement to determine levels of service occurs with major customers, notably airlines (in relation to security of jet fuel supply).
Demand	Core	Demand planning is undertaken by fuel companies to determine major customer requirements, and this drives future investment decisions. Sufficiency of demand planning for emergencies has been a concern, resulting in government intervention on minimum stockholdings.
Evidence	Core	It is understood that there is good data and documentation, particularly for pipelines (driven by meeting Pipeline Standards) but less so for civil structures and other asset types.
Risk	Core	There are strong, safety-driven practices due to the hazards of the industry. Risk management and business continuity planning is understood to be one of the stronger aspects of asset management. However, there is little visibility of resilience planning for major shocks and disruptions.
Operational planning	Intermediate	This is the most mature area of practice as reliability is a key focus and preventative maintenance programmes are in place to manage risk of condition-related failures. Incident/emergency

Asset management function	Maturity	Overview of current practice
		management at a small scale is well-practiced with regular supply chain disruptions managed without affecting customers.
Capital planning	Core	Capacity-related investments are based on meeting supply contracts with major customers. Pipeline standards require lifecycle planning for those assets, but there is no evidence of long-term capital investment plans (or at least these are not disclosed).
Financial management	Core	Fuel companies have mandatory requirements to meet Financial Reporting Standards, such as valuation of assets. However, alignment of financial and asset lifecycle information is not undertaken and there is no requirement to prepare long-term financial forecasts (3–5-year horizon is typical).
Asset management plans	Basic	AMPs are not a regulated requirement, but some industry participants are working towards ISO 55001 as good business practices.
People	Basic	Asset management is typically not a well-recognised or resourced function, though aspects are undertaken in various parts of fuel companies, typically the Operations department.
Service delivery	Core	Insufficient information to determine maturity, default is a 'core' rating.
System and improvement	Basic	The concept of establishing and continually improving an asset management system is not widely recognised, though some industry participants are voluntarily working towards alignment with ISO 55001. However, quality standards are common practice (ISO 9001).

Table 3: Asset management maturity, Fuel sector

Liquid fuels funding

Funding is provided through user-pays charges, with some regulation regarding the transparency of wholesale pricing methods in the Fuel Industry Act 2020. The primary goal of the Act is to promote market competition for the benefit of consumers

Recommendations for liquid fuels sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Energy: Liquid fuels
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Currently many agencies have a role in defining infrastructure asset management requirements.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: It was difficult to identify an asset management lead in the fuel organisations that were approached.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The sector is already highly regulated.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There is limited publicly available asset performance information for this sector.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The sector is already highly regulated, though AMP disclosures for critical infrastructure are recommended.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: Fuel infrastructure is highly critical and MBIE maintains oversight of security of supply resilience.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	Medium relevance: Sector operates in a competitive market.

There are some broad regulatory changes that will support improved asset and risk management such as the Emergency Management Bill (repealed in early 2024, but a replacement is being drafted), and potential regulation for critical infrastructure providers akin to that in Australia and the UK. Further, MBIE is introducing regulation to improve fuel security by mandating minimum stockholdings.

Some specific additional recommendations for the fuel sector include:

1. Require disclosure of AMPs to government for critical infrastructure facilities and assets, including long-term plans (LTPs) for future asset renewal (noting that confidentiality and commercial sensitivities will need to be managed).

The risks and economic consequences of failures of critical assets have been experienced a number of times, most notably the failure of the Wiri-Auckland pipeline which significantly disrupted air transport. The focus of disclosure reporting should move beyond capacity management to ensuring there is adequate future planning and investment for these critical assets.

2. Development of a work programme for the Fuel Sector Coordinating Entity (chaired by MBIE) to address issues identified in the National Fuel Contingency Plan, and annual reporting of progress.

Several key issues were identified in the National Fuel Plan that have not been progressed. For example, there are significant risks around lack of planning for continued fuel supply in an emergency, if critical assets are damaged (for example, ability to offload fuel without an operational wharf).

Liquid fuels reference documents

- Infrastructure Commission, Te Waihanga: *Energy Sector State of Play Discussion Document*.
- NZ Lifelines Council: *NZ Critical Lifelines Infrastructure, National Vulnerability Assessment 2020 and 2023*.
- NEMA/MBIE: *National Fuel Plan, 2022*.
- MBIE: *Fuel resiliency policy package 2022*.

4. Telecommunications

Telecommunications overview

'The telecommunications sector is one of the most complex utility frameworks in New Zealand. It encompasses a blend of commercial and competitive interests. Telecommunications technology is always changing and requires a high level of interconnectedness between the various providers who share parts of the network to exchange data.

As technology changes, so does consumer demand, with the shift towards more efficient and high-capacity broadband technologies supported by the expanding coverage of fibre and alternative technologies across the country. This has resulted in marked changes to the telecommunications landscape, such as satellite services becoming accessible to mass market and Chorus signalling its intention to retire the copper network within the next ten years to become an all-fibre company, amongst other initiatives'.⁶

Telecommunications sector players

Figure 7 shows the diversity of telecommunication providers, ranging from the fixed line carriers to the high-level application layer media providers delivering services via a broadband connection or broadcast at radio frequencies. There are over a hundred retail service providers that deliver a wide range of services over the aggregation of telecommunication networks.

Note that this review includes the main asset-owning organisations, not the retail sector, which is excluded from the figure below. Furthermore, not shown in Figure 7, are the new cell tower owning companies Forty South and Connexa, which have purchased One NZ, Spark, and 2degrees towers.

⁶ NZ Lifelines Council, *National Critical Infrastructure Vulnerability Assessment 2023*, C-49

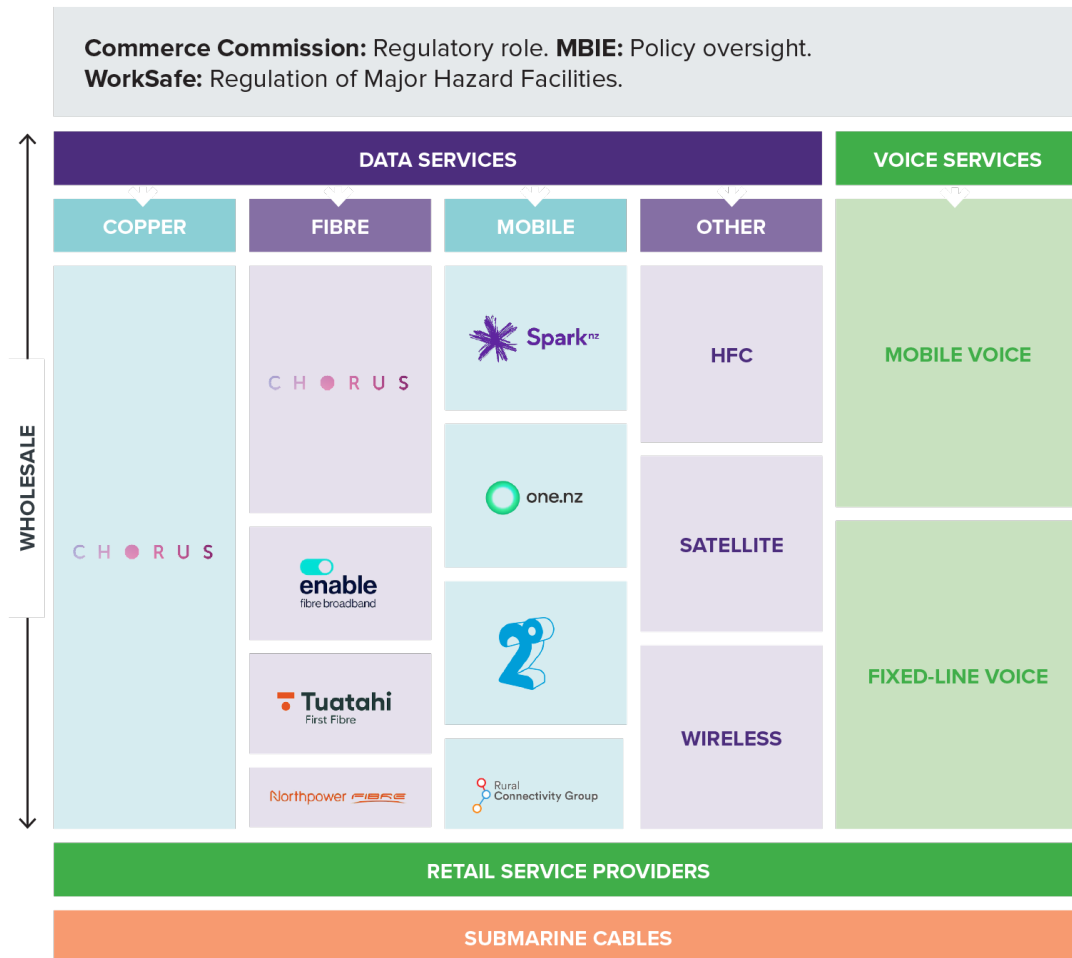


Figure 7: Telecommunication providers in New Zealand (Adapted from NZ Lifelines Council, National Critical Infrastructure Vulnerability Assessment 2023)

Infrastructure asset performance

There is limited publicly available information to form a sector-wide view of the overall age, condition, performance of assets and or long-term investment needs in the networks. There are some regulated information disclosures, and the Commerce Commission has introduced some asset reporting for fibre providers and provides an annual telecommunications monitoring report, though the information focusses on aspects such as customer access to services, data usage and affordability.

The telecommunications sector includes a large number of young assets, particularly in the fibre sector (with respect to their expected total lifecycle) but also has some ageing parts of the network.

Telecommunications services are often disrupted in emergency events – sometimes due to overloading in the immediate aftermath, sometimes due to direct asset damage (for example, the core network cables that run north-south have been damaged several times). While there are two or three cables providing redundancy for each other, many events have seen multiple cable failures and total service loss (for example, during the Kaikoura Earthquake and Cyclone Gabrielle). However, the main cause of service disruption is loss of power, and while limited battery backup times at cell sites can be an issue, battery performance is irrelevant when backhaul connectivity to mobile sites is lost.

Apart from internal sector dependencies (for example, mobile sites relying on backhaul fibre) and power failure, the telecommunication sector is also critically dependent on roads to access sites, bridges which carry telecommunication cables, and diesel to supply generators when power is out.

Sector challenges

Overall

The *Telecommunications State of Play* identified the following sector challenges:

- social inequality in digital access,
- rural connectivity,
- resilience to cyber threats,
- rapid demand-led growth in new technology,
- data storage: a key opportunity going forward, and
- satellite broadband (a potential disruptor).

Technological change

The fast-moving pace of technology requires a different approach to asset management, as asset obsolescence often occurs before physical asset lifecycles end. For example, old Exchange buildings are being replaced with much smaller equipment and 5G technology reduces cell tower coverage. Furthermore, asset ownership is changing as companies divest 'non-strategic' assets (for example, sale of cell towers). The oldest part of the networks, the old 'landline' and copper lines, are going through a managed withdrawal process.

The ability to do long-term forecasting in a sector with rapid technological change creating asset obsolescence, is difficult and requires flexibility in approach. For example, electronics in exchanges and on mobile towers typically have 5–7 year economic lives. Other assets such as ducts, poles, buildings, and fibre cables are long-life assets and can be managed in a similar way to other sectors.

Changes to building resilience standards (MBIE review) and the potential introduction of critical infrastructure regulation could have a major impact on the sector, though this impact is not yet defined.

Telecommunications asset management drivers

Legislation and regulation

The broader telecommunications sector is regulated in relation to consumer rights and access, and pricing for Chorus anchor services by the Telecommunications Act. Additional information disclosure regulation is in place for the fibre access businesses - the focus is on fibre services, but this also picks up many critical assets that provide shared services (for example, exchanges).

AMPs are being produced by some sector participants, though these are not currently required under these disclosures, beyond a report on asset management capability. Chorus are required to produce an integrated fibre plan (analogous to an asset management plan) as part of their price-quality proposals.

The Civil Defence and Emergency Management Act 2022 (CDEM Act), National Plan and Guide to the National Plan have requirements for lifeline utilities relevant to asset management, such as undertaking *risk and vulnerability assessments*. The Act is under review.

Industry guidance

There is no specific industry guidance found of direct relevance to telecommunications infrastructure asset management. The sector is not actively involved in national asset management industry bodies like IPWEA and Āpōpō. However, there is plenty of general guidance and standards that entities can and do use.

The Telecommunications Forum has been stepping up in its sector coordination role, and potentially could provide some leadership and guidance around asset management in the same way the EEA has for electricity.

Telecommunications asset management maturity

The high-level assessment presented in Table 4 presents average maturity scores for the sector, but the results need to be interpreted with caution because:

- There was no documented available information on asset management maturity in the sector, and the scores are based on interviews with only two industry participants, and a feedback meeting convened by the Telecommunications Forum (TCF).
- We note that telcos may have existing maturity assessments, but they were not made available to the authors for this study.
- Chorus is one of the two participants interviewed and is likely to have higher level of maturity due to evolving regulation of the fibre service companies.

Given the limited evidence base described above, there is a low confidence that the maturity scores and comments below are representative of the overall sector. An overall summary of sector maturity is presented in Table 4.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Chorus have an asset management policy, AMP and Strategic AMP aligned with their strategic direction. One NZ has a long-term strategic plan that determines business priorities and CAPEX and OPEX needs.
Levels of service	Intermediate	Regulated entities have levels of service and performance measures prescribed in legislation and regulations, such as availability of and number of connections to different types of services, average speeds. Market conditions necessitate that telcos strive to understand and meet customer level of service and demand requirements.
Demand	Intermediate	As above. Customer analysis and product developments to meet future needs are a critical part of asset investment planning.
Evidence	Basic	Generally, there is good information on overall network performance (utilisation, demand). Some assessments have been done on critical facilities/buildings (for example, exchanges), including seismic assessments but generally there is ad hoc data on condition and performance of assets and asset classes. Asset data is typically held in disparate systems and not maintained under data quality controls.
Risk	Core	Most telcos have a corporate risk management framework and analysis of strategic risks is part of investment decision making. Operational and asset-level risk strategies are mostly ad hoc or absent, though most telcos have a criticality hierarchy for major asset classes (for example, cell sites and exchanges) and some have defined resilience standards for these (for example, seismic ratings for IL3 and 4 buildings). Response plans exist and are exercised in larger companies.
Operational planning	Core	Planned and reactive operational strategies are defined and implemented for some critical asset classes, notably major buildings/facilities. There is recognition that lifecycle planning can provide benefits in terms of asset reliability and reduced lifecycle costs, but practice is just evolving.
Capital planning	Core	New asset investments have been largely driven by customer demand, technological changes, and government investment (fast broadband). Renewal planning is generally focussed on short-medium term, with longer-term, lifecycle-based investment forecasts (i.e. including renewal and disposal costs) identified as a future improvement for longer life assets.
Financial forecasts	Core	Financial forecasts are typically three to five years at most, with longer term forecasting challenging in this fast-moving sector. Core practice is achieved through meeting corporate financial reporting standards.
Asset management plans	Basic	Chorus have an AMP and Strategic AMP, and One NZ has a strategic plan, but we do not believe that un-regulated parts of the sector typically have AMPs or equivalent documentation.
People	Basic	Chorus has established a Centre of Excellence to build capability and capacity to improve asset management practices and meet regulatory requirements. Asset management capability in other areas appears to be focussed on major facility / building management.

Asset management function	Maturity	Overview of current practice
Service delivery	Core	Most physical works are outsourced through competitive tendering processes, though some specialist activities are undertaken in-house. Procurement processes and controls of outsourced activities are understood to be widely in place.
System and Improvement	Basic	Some operational systems and practices are well documented and managed, but processes and systems specific to asset management (such as renewal forecasting, asset assessments) are only just evolving in regulated parts of the sector.

Table 4: Asset management maturity, Telecommunications

Telecommunications funding

Funding is via user-pays charges with fees set by the telecommunications businesses. Chorus is subject to revenue limits under price-quality regulation, plus some of its 'anchor products' are subject to direct price control.

The following feedback was received by One NZ, in relation to the challenges of investment decision making in this sector:

It should be noted that in competitive retail markets, like the one that telecommunications providers operate in, (with networks that are funded entirely from the provision of services in these competitive markets), there is no certainty that costs of investment can be either passed through or recovered. Operators can only pass on costs that consumers are willing to pay. An operator that prioritises resilience and invests more in its own network face competition from operators who adopt a lower cost model, offering services via less resilient network assets but at lower prices that are attractive to consumers. Even if all operators were required to make the same investment, there is no certainty that operators can pass this cost on to customers who benefit (because any single operator may choose not to and may trade off lower prices and higher market share with those operators who seek cost recovery losing customers and market share to the lower priced competitor).

There have been a range of government funded initiatives where the market has failed to provide sufficient or timely service provision. These include Ultra-Fast-Broadband, Rural Broadband Initiative, Mobile Black Spots and Rural Capacity Upgrades.

Recommendations for the Telecommunications sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Telecommunications
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Currently many agencies have a role in defining infrastructure asset management requirements in the industry.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is already in place for Commerce Commission regulated fibre organisations, less clear for other organisations.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Telecommunications
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: AMMAT information is buried in disclosure documents, largely self-assessed.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There is limited public disclosure of asset performance information.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: AMPs are only starting to be regulated in some parts of the sector. AMPs.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Telco services are critical and there is debate about the extent to which the market incentivises investment for wider community benefit.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time).

There are some broad regulatory changes that will support improved asset and risk management such as the Emergency Management Bill (repealed in early 2024 and currently being redrafted). There is also potential regulation for critical infrastructure providers akin to that in Australia and the UK. Further, a regulatory regime is being rolled out for fibre service providers though as mentioned earlier, the decision on a requirement for local fibre companies to prepare AMPs, is deferred till 2025.

Some specific additional recommendations for the telecommunications sector include:

1. Require AMPs and information disclosures as per key recommendations 4 and 5.

Information disclosures are intended to provide the government and regulators with confidence that assets are being managed effectively. While there are anecdotally some areas of good practice in the

sector, there is limited visibility of this beyond Chorus, at present. This requirement is intended to encompass the whole telecommunications sector, not just those currently under asset management regulation.

2. Consider the need for a stronger sector coordination role in relation to asset management, potentially through the TCF.

During sector meetings for this project, the 'telco is different' argument was often made, indicating that the sector believes that regulation and practices for other more static sectors are not necessarily appropriate for the rapidly technologically evolving telco sector. The TCF or other industry body could take a lead role in developing asset management guidance more relevant to the telco sector assets, within the umbrella of an established infrastructure asset management system lead.

3. Sector preparedness for emergency management, critical infrastructure reforms and changes to Building Resilience Standards. Telecommunications is probably the most impacted sector as most other 'lifelines' already have quite a bit of regulation in this space.

Telecommunications reference documents

- Infrastructure Commission, Te Waihanga: *Telecommunications Sector State of Play Discussion Document*.
- NZ Lifelines Council: *NZ Critical Lifelines Infrastructure, National Vulnerability Assessment 2020 and 2023*.

5. Water and waste: Three waters

This report reflects the structures of the sectors as at the end of 2023. Subsequent structural changes to government policy on the Three Waters reform are not reflected. Structural changes hadn't had an impact on asset management maturity ratings at the point of time of this report.

Water sector overview

Public water supply, wastewater, and stormwater ("three waters") services are primarily owned and managed by local government, though some central government agencies also provide services.

There are a huge range of scheme network types and scale, from Auckland's water supply network to small town networks.

At the time of assessing the sector, significant sector reforms were underway with proposals for ten new water services entities co-governed by local government and iwi. The reforms were driven by failures such as the Havelock North water contamination incident and the sector challenges described later in this Section. The enabling legislation has now been repealed, but regulation is still being developed to support the Local Water Done Well programme.

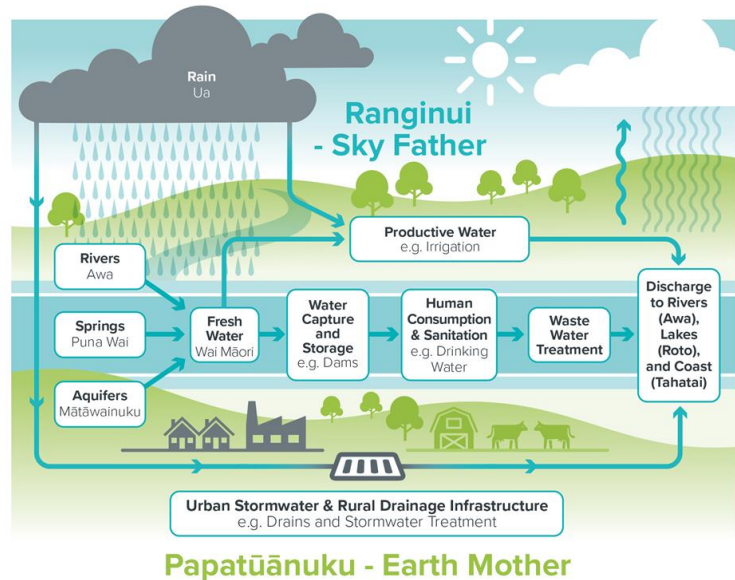


Figure 8: One Wai - water is interconnected

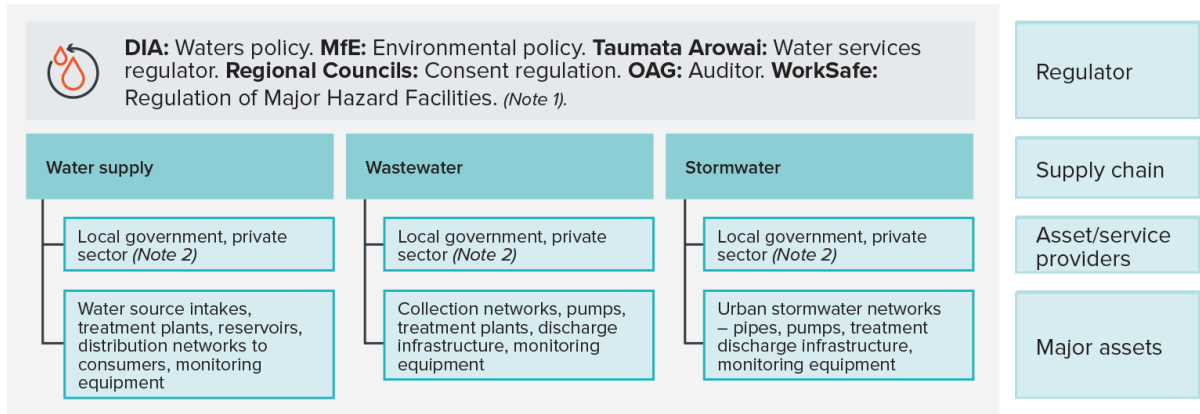
Water, wastewater and stormwater extract and discharge into the same water cycle and the need for integrated management is recognised through the concepts of *One Wai* (Refer to Figure 8).

Sector players

The main sector players are:

- **Local government:** Currently owns and manages three-waters assets and services, both directly and through Council-owned entities such as Watercare and Wellington Water.
- **Department of Internal Affairs:** Central government policy and oversight.
- **Taumata Arowai:** As part of the reforms, the drinking water regulator was established (replacing the Ministry of Health) with the aim of ensuring safe and reliable drinking water to all communities.
- **Office of the Auditor-General:** Audits the local government sector. Of relevance to this report, this role includes auditing the asset management evidence to support LTPs.
- **Private sector:** Most physical works activities are outsourced to network maintenance and capital works contractors, though some councils still have an in-house operations and maintenance workforce.

An economic regulator (likely to be the Commerce Commission) and consumer protection mechanisms are proposed as part of the reforms.



Note 1: The regulatory framework is being reviewed as part of water reforms, including the proposed establishment of an economic regulator (likely to be the Commerce Commission).

Note 2: Many central government agencies also own and manage three waters networks as part of their activity and asset base, e.g. DoC.

Figure 9: Sector players, Three waters

Infrastructure asset performance

Local government is required to establish and report on asset levels of service and performance under the Local Government Act 2002 (LGA). The Act was amended in 2012 to bring in mandatory non-financial reported performance measures, intended to align performance measures and improve asset performance reporting practices. Anecdotally, these have not been seen as a useful suite of metrics to inform asset management practices.

Water New Zealand undertakes the National Performance Review (last published for 2021/22 year, with just under half of councils participating). This is an annual performance comparison of drinking water, wastewater, and stormwater service provision in New Zealand. Results can be viewed at [National Performance Review: Water New Zealand \(waternz.org.nz\)](http://National Performance Review: Water New Zealand (waternz.org.nz)).

Sector challenges

The sector issues have been well explored as part of the business case for the water reforms. The main challenges include:

- Funding and providing infrastructure in major growth areas. Issues include ability to accurately quantify, and therefore fund through development levies, asset costs to meet growth. Many councils often end up reacting to developments in a sub-optimal way. Noting that static and declining populations are also challenging where expensive systems are being funded through a small rating base.
- Planning for, funding, and delivering major renewal programmes for ageing networks, with highly publicised concerns about sustainable levels of funding to manage our existing asset networks.
- Workforce capacity and capability – particularly in relation to skills both to improve asset management practices and scope/deliver infrastructure investment programmes.
- Resilience of networks and organisations to ensure continued service provision following disasters, and to cope with climate-change induced weather changes (more severe flooding, droughts, sea level rise).
- Meeting increasing environmental expectations for discharges.

Water sector asset management drivers

Legislation and regulation

The water sector is required to prepare LTPs under the LGA (Section 10), with AMPs providing the underlying evidence and 'story' for those sectors. There are many other related areas of regulated practices, such as Drinking Water Standards, DIA non-financial performance reporting, and environmental regulation through the Ministry for the Environment (MfE) and regional councils.

Work is being done to develop legislation to support the Local Water Done Well programme, including better enabling local authorities to establish joint CCOs (in place) and regulation to manage many of the issues described above, including the need for better long term renewals planning.

Industry guidance

Āpōpō (formerly IPWEA NZ) played a key role in advocating for legislative change (LGA 2002 and amendments) and supporting the development of asset management practices to meet the legislative intentions. This has largely been through the IIMM and other guidelines, supported by training programmes.

The Office of the Auditor-General has been a key partner in this work, and this has been instrumental in helping to drive asset management improvement in the local government sector.

Despite all the above, the sector still varies in maturity with many councils struggling to deliver asset management improvement programmes, further discussed below.

Water sector asset management maturity

Current practice varies significantly with larger and better-resourced water authorities generally at a higher level of maturity than small rural-based councils, though there are also examples of excellence in small authorities and vice versa for large ones.

Overall, asset management maturity is estimated to fall into the core-intermediate area for water supply and wastewater and core for stormwater, with comments by asset management function tabulated in Table 5. These results were informed by the asset management maturity work being done by the DIA for water reforms.

An overall summary of sector maturity is presented in Table 5.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Strategic analysis occurs as part of the development of AMPs, LTPs and Infrastructure Strategies, and are summarised in those documents. Asset management Policies are in place in most authorities, though often not highly visible or understood.
Levels of service	Core	Mandatory performance measures are set by the DIA, though these do not provide a comprehensive framework for levels of service monitoring. Community consultation mostly occurs through the LTP; specific level of service / cost debate usually occurs only at the Council level, supported by varying quality of level of service options analysis.
Demand	Core	Demand forecasting is commonly undertaken for all water supply and wastewater schemes, often just based on population-based forecasts. Demand management strategies are generally developed and being applied (water supply leak detection, wastewater inflow and infiltration monitoring), though efforts are financially constrained.
Evidence	Core	<p>All water authorities have asset registers, sufficient to form valuations (age, replacement cost, expected life), with assets mapped spatially in a GIS system. Condition assessment programmes are most well defined for above ground assets (with assessment frequencies based on criticality) and wastewater pipes (CCTV inspections).</p> <p>A variety of asset management information systems are used, with a common challenge being whether to use enterprise system asset management modules (which often don't meet user needs) or bespoke asset management software (challenge then to interface with corporate systems).</p>
Risk	Core	Local authorities generally maintain corporate risk policies, frameworks, and registers with activity-based risk registers for water supply, wastewater, and stormwater. Asset criticality frameworks are developed, but ratings are often not populated in the asset register or formally used in O&M and renewal prioritisation.
Operational planning	Core	Operational decisions such as quantity/type of planned maintenance and maintenance intervention strategies are usually made based on staff knowledge combined with available condition and performance data (see Evidence). Many water authorities schedule and record maintenance activities at an asset level in an asset management information system, though the use of this information in asset management planning is often limited.
Capital planning	Core	<p>Renewal forecasts are typically based on 'replace at end of life' but an increasing number of authorities use predictive models based on condition, performance, and maintenance history. Level of service and growth projects are typically based on master planning and hydraulic/hydrological models. A key challenge is maintaining a strong pipeline of well scoped capital projects and delivering these on time and to budget.</p> <p>Capital projects prioritisation is often defined by a corporate LTP process.</p>
Financial forecasts	Core	Ten-year forecasts in AMPs, but can be a convoluted process once these get into the Long-Term Plan process with other activities with often limited transparency around budget prioritisation and risk and level of service impacts. 30-year forecasts are prepared as part of Infrastructure Strategies.
Asset management plans	Core	AMPs are in place for all authorities, though variable quality. A key challenge is the process for the integration of AMPs and LTP process.
People	Core	<p>Capability and capacity are a significant issue, as for most other sectors.</p> <p>Lack of strong leadership and role definition are often contributors to poorly executed asset management improvement plans, and the need for strong cross Council coordination of asset management functions.</p>
Service delivery	Core	Councils/water authorities have procurement rules in place to guide types of contracts and tendering practices. More advanced authorities have undertaken formal evaluation to decide what, when and how activities are most effectively delivered.
System and improvement	Basic	<p>Process documentation and quality management is generally low maturity. This is an important issue as knowledge and processes are lost when key staff leave.</p> <p>All AMPs have an asset management improvement plan, usually based on asset management maturity assessments and gap analysis. However, implementation of these plans is generally poor, can be attributed to lack of leadership commitment and financial and people constraints.</p>

Table 5: Asset management maturity, Three waters sector

Water sector funding

The ability of councils to raise and prioritise funding for three waters investment has been one of the key drivers for the water sector reforms. While the requirement to ‘fund’ depreciation expense was expected to see an increased investment for renewals and rehabilitation, in many cases this funding was not earmarked for this purpose and has been spent on other local government activities.

The *Three Waters Reform Case for Change* noted that:

“The three waters services are expected to cost \$2 billion per year to operate, and cost councils around \$2.7 billion per annum in maintaining and upgrading these networks”.

And in relation to funding mechanisms ...

“Different services are charged for in different ways. Most local authorities levy rates for water services that are fully or partly based on the land or capital values of landowners’ properties. Fixed, targeted rates are most common for the supply of drinking water to unmetered properties, with a combination of fixed and volumetric charges common for metered properties. Wastewater tends to be charged on a fixed, targeted rate basis, and sometimes on a number of pans or volumetric basis. Stormwater has public good characteristics and is typically charged as part of a council’s general rate, as a specific targeted rate or some combination of the two”.

Recommendations for the Water sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Three waters
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Currently many agencies have a role in defining infrastructure asset management requirements in the industry.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Most existing authorities have an accountable asset management lead.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Many are currently undertaken as self-assessments, with low rates of progress against improvement plans.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: DIA mandatory measures considered inadequate.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Three waters
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Reform focus on developing AMPs, need to maintain this good work.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Resilience investments have tended to take a lower priority to other types of projects, though momentum is changing.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time).

Sector reforms are establishing a legislative and regulatory framework aimed at driving good asset management practice. Therefore, beyond the key recommendations in this report, it is not considered useful to make specific recommendations for this sector.

Water reference documents

- Department of Internal Affairs: *Three waters reform case for change and summary of proposals, 2022*
- Infrastructure Commission, Te Waihanga: *Water Sector State of Play Discussion Document, 2021*
- NZ Lifelines Council: *NZ Critical Lifelines Infrastructure, National Vulnerability Assessment 2020 and 2023*
- IPWEA: *International Infrastructure Management Manual, 2015, Section 5.3 (NZ)*.

6. Water and waste: Solid waste management

Solid waste management sector overview

The solid waste management sector includes:

- **Landfills:** Landfills are designed to safely dispose of non-recyclable and non-recoverable waste. They are engineered facilities that follow strict regulations and standards to prevent environmental contamination. New Zealand has various landfills located throughout the country, managed by local authorities or private operators. There are estimated to be over a thousand closed landfills. The closed landfills that were owned by councils must be monitored and managed by the councils - there are "aftercare" liability provisions in the balance sheets of councils to fund this.

There are approximately 40 Class 1 landfills in NZ that accept a wide range of solid waste (commercial, industrial, households). Class 1 landfills are mainly owned by territorial councils, often in a regional partnership, or are joint ventures between councils and private operators. Class 1 landfills received 3.5 million tonnes of waste in 2019. There are estimated to be seventy-eight class 2 and 3 landfills mainly dealing with construction and demolition waste.

- **Transfer stations:** Transfer stations serve as intermediate points for waste collection and transportation. They are facilities where waste from collection vehicles is consolidated and sorted before being transported to landfills or other treatment facilities.
- **Recycling facilities:** Recycling facilities play a vital role in processing and sorting recyclable materials collected from households, businesses, and recycling drop-off points. These facilities use specialised equipment and machinery to separate different types of recyclables, such as paper, cardboard, glass, plastic, and metal, for further processing and recycling.
- **Resource recovery centres:** Resource recovery centres, also known as recovery parks or reuse shops, are facilities that focus on recovering valuable materials and items from the waste stream diverting them from landfill.
- **Composting facilities:** Composting facilities receive and process organic waste, such as food scraps and garden waste, to produce compost.
- **Anaerobic digestion facilities:** Anaerobic digestion facilities utilise organic waste, such as food waste and agricultural residues, to produce biogas and organic fertilisers. The waste undergoes a biological process called anaerobic digestion, where microorganisms break down organic matter in the absence of oxygen, generating biogas that can be used for energy production.
- **Waste-to-energy plants:** Waste-to-energy plants, also known as energy recovery facilities, convert waste into energy through processes like incineration or gasification. These facilities use the heat generated from burning waste to produce electricity or heat, contributing to the renewable energy mix.

Sector players

MfE in New Zealand plays a significant role in waste minimisation and management. As the lead agency responsible for environmental policy and regulations, the MfE's key role is to develop and implement waste management policies and initiatives to promote sustainable waste practices, and to minimise the environmental impact of waste. MfE provides guidance to regional councils and territorial authorities. The MfE works in collaboration with other government agencies, local authorities, and stakeholders to promote sustainable waste management practices and achieve waste reduction targets.

Performance measures and indicators related to waste management are primarily set and monitored by MfE and other relevant agencies responsible for waste management policies and regulations. These measures include targets for waste reduction, recycling rates, landfill diversion, and other key performance indicators specific to waste management and resource recovery.

MBIE plays a supporting role in waste management and resource efficiency initiatives. MBIE's involvement in waste minimisation primarily occurs through its engagement with businesses and industries. MBIE works to encourage businesses to adopt sustainable practices, improve resource efficiency, and reduce waste generation. It provides support, information, and resources to help businesses identify opportunities for waste reduction, implement best practices, and develop innovative solutions.

Waste Management Institute of New Zealand (WasteMINZ) has a good practice role and provides a platform for collaboration, knowledge sharing, and advocacy in the sector.

Local government: Waste and resource recovery activities are primarily a local government responsibility with support from contracting organisations on an operational level. Specific activities include:

- **Waste collection and disposal:** Local councils are responsible for organising waste collection services within their areas. This includes the collection of household waste, recycling, and in some cases, green waste, and organic materials. Councils may operate waste collection services directly or contract them out to private waste management companies. They are also responsible for managing landfill facilities or contracting out waste disposal services.
- **Waste minimisation and recycling:** Councils play a crucial role in promoting waste minimisation and recycling within their communities. They develop waste management and minimisation plans and policies, which outline strategies and targets for waste reduction, recycling, and resource recovery. Councils often implement recycling programmes, establish recycling centres or drop-off points, and provide education and awareness campaigns to encourage recycling and waste reduction practices.



Figure 10: Sector players, Solid waste management

Infrastructure asset performance

The infrastructure supporting the resource and recovery sector generally perform well. There have been issues with leaching and contamination of closed landfills, and this needs continual monitoring.

Sector challenges

The key challenges facing the sector are:

- Lack of recycling infrastructure outside urban areas. Recycling facilities require large investments which are not economical in areas with lower population density, which leads to higher waste to landfill in those areas.
- Increasing limitations on the ability to ship waste and recyclables to other countries.
- Closed landfills are vulnerable to sea level rise, and weather events, which increase the risks of exposing contaminated material to the sea and rivers.
- Consolidation of landfills around New Zealand. Traditionally each Council had multiple tips, but these are fast being closed and “super” Class 1 landfills created. Class 1 landfills are required to be “sanitary” landfills that are fully lined and have leachate disposal systems. Further consolidation is required.
- Co-operation in running and owning landfill. There are a variety of forms of ownership and operations of landfills, but the trend is toward regional ownership (multiple council) and joint ventures with the private sector.
- Aftercare of closed landfills is a major issue. This could be termed “liability management” as opposed to asset management. Each council is likely to have aftercare liabilities showing up in their balance sheets. There is MfE guidance on how to manage closed landfills. A review of the largest six territorial councils shows that aftercare liabilities as of June 2022 totalled \$214 million.
- More “problematic” waste – asbestos, hospital waste, contaminated soil. This needs special handling which is costly.

In May 2023, it was reported that an old Dunedin landfill (Kettle Park) was capped in the 1950s, but continual storms and coastal erosion had revealed that waste once more.

In 2019, high seas washed sand along 200 metres of Ocean Beach, exposing rubble placed in front of the dunes 12 years earlier to help protect the old landfill from being exposed. (Stuff 30 May 2023)

- One of the positive developments in this sector recently has been larger, sophisticated landfills, which will become as much “energy parks” as waste recipients with ETS capability, environmental planting, and production of gas/electricity which can be returned to the national grid (for example, Kate Valley in North Canterbury).
- Proposed increases by MfE of landfill waste levies will mean increases in landfill disposal charges and increase the risk of illegal dumping.

Solid waste management asset management drivers

Legislation and regulation

Waste management in New Zealand is regulated through various laws and regulations at both the national and local levels. The key legislation governing waste management in New Zealand includes the RMA and the Waste Minimisation Act 2008 (WMA).

- RMA: The RMA is the primary legislation for environmental management in New Zealand, including waste management. It sets out the framework for managing waste and promotes sustainable resource use. Under the RMA, regional councils and territorial authorities have the authority to develop and implement waste management plans and policies. The RMA also regulates discharges to the environment, discharges of waste to land, and the residual effects of those activities, such as leachate and landfill gas discharges.
- WMA: The WMA focuses specifically on waste minimisation and resource recovery. It aims to reduce the amount of waste going to landfill and promote recycling and other forms of waste recovery. The WMA established the Waste Minimisation Fund, which provides financial support for waste minimisation initiatives and projects.

The WMA requires territorial authorities to review its waste management and minimisation plan at least every six years, and to complete a waste assessment. The Minister has the power under the Act to set performance standards for the implementation of waste management and minimisation plans.

In addition to these overarching laws, there are several other regulations and guidelines that regulate waste management in New Zealand:

- Hazardous Substances and New Organisms Act 1996: This act regulates the management and disposal of hazardous substances, including hazardous waste.
- Waste disposal levy: It is imposed on waste disposed of at landfills and was introduced to discourage waste going to landfills and promote alternative waste management methods.
- National Environmental Standards for Air Quality: These standards include provisions for managing emissions from waste management facilities, such as landfills.
- Regional and local council bylaws: Regional councils and territorial authorities can establish their own bylaws to regulate waste management activities within their jurisdiction. These bylaws may include specific requirements for waste collection, recycling, and disposal.
- Environmental Reporting Act 2015: This act requires regular reporting on the state of New Zealand's environment, including waste management indicators.

Industry guidance

- WasteMINZ has good practice for a range of solid waste issues including aspects of landfill management
- Centre for Advanced Engineering (University of Canterbury) – Landfill guidelines.

Solid waste management asset management maturity

There is currently no legislative or regulatory requirement to assess the maturity of waste asset management maturity, outside of the local government auditing of LTPs. However, many local authorities do have solid waste AMPs. Waste and recovery asset management is generally less mature than other areas in council. The weakest element is the quality of asset data. An overall summary of sector maturity is presented in Table 6.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	The WMA requires territorial authorities to have a waste minimisation plan, which provides the strategic direction to this activity. The activity requires both a strong operational focus as well as a strategic direction.
Levels of service	Core	DIA mandates specific waste minimisation performance measures, however, these are not collated, nor are they analysed by any centralised body. Local government organisations are overall reasonable at setting and monitoring levels of service, especially for waste activities.
Demand	Core	Good demand planning is essential for this activity to ensure sufficient capacity to meet changing demands. There are significant trends that affect demand such as the move to food scrap collections.
Evidence	Basic	The asset data in this sector is generally poorer than other local government activities. Major assets such as transfer station asset data is often not broken down into components, and there is little condition monitoring to detect early failure signs.
Risk	Intermediate	Waste and resource recovery is a naturally risk averse activity, which is why this element scores higher than other elements.
Operational planning	Core	The activity has an operational focus and with its high-profile role in the community, this element usually scores at a core level for local government organisations.
Capital planning	Core	Capital requests for major investments such as transfer stations require business cases. Renewal planning is limited by usually poor-quality asset data.
Financial management	Core	A large portion of funding comes from rates and user charges, and operations are generally managed tightly through contractual arrangements.
Asset management plans	Core	All local government organisations are required to complete Waste Minimisation Plans which inform AMPs. In discussion with Waste Management Limited, most landfills have "Landfill Management Plans". These are a form of asset management planning but concentrate on compaction targets, available "air space" and environmental monitoring. Often solid waste AMPs of territorial councils concentrate on eco-depots, transfer stations and recycling facilities.
People	Core	Waste management gets a reasonably high profile within local government, as it is a highly visible activity that affects ratepayers, and the MfE maintains accountability. Asset managers in this sector are either usually very strategic and focused on opportunities to minimise waste, or very operational and focussed on ensuring the continuity of service.
Service delivery	Core	This area is generally managed through contractual arrangements with commercial suppliers.
System and improvement	Core	In some instances, operational imperatives can detract from overall asset management improvements.

Table 6: Asset management maturity, Solid waste

Solid waste management funding

The Waste Minimisation Fund, administered by the MfE, provides financial support for projects and initiatives that aim to reduce waste, increase recycling, and promote resource recovery.

The major sources of solid waste management infrastructure and service funding are:

- council rates,
- user charges,

- waste disposal levy,
- waste commodity markets, and
- the Provincial Growth Fund and other one-off grants.

Funding of landfill disposal is predominantly from disposal fees (user pays). There are usually differential fees between general waste and special or contaminated waste. MfE had made funding available to landfills from the Waste Levy for beneficial projects such as energy generation from landfill gas.

Recommendations for solid waste management

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Solid waste
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: MfE has a policy advice role and WasteMINZ provides collaborative opportunities, but neither plays the system lead role proposed in this report.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is often in place for local authorities, but not always.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Maturity assessments are currently undertaken voluntarily by local authorities. This recommendation is relevant for all local authorities as solid waste asset management maturity is generally low.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: Local authorities are required to report on consistent waste minimisation measures. May be relevant for other asset performance measures.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: AMPs are widely in place along with Waste Minimisation Plans; however, the AMPs are not always disclosed to the public.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Solid waste
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: The consequences of failure in an extreme event are high for solid waste facilities. Investment in adequate resilience should be a high priority.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: Asset management workforce development is a key issue across the infrastructure system.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Further areas for the solid waste to focus asset management improvement are:

1. Improve the quality of asset data, including condition performance data for critical assets such as transfer stations

The risk of transfer station asset failure is high, due to ageing plant and poor asset condition collection for a number of councils.

2. Encourage the OAG to include a specific audit focus on the alignment between waste minimisation plans and local government waste AMPs

These are often not aligned and can lead to confused decision making.

Solid waste management reference documents

- *New Zealand Waste Strategy*
- *Legislation and Regulations: Waste Minimisation Act 2008*
- *National Environmental Standards for Air Quality*
- *Resource Management Act 1991*
- *Waste Assessment Guidelines*
- *Best Practice Guidelines for the Preparation of Waste Management Plans*
- *National Waste Data Framework*
- Infrastructure Commission, Te Waihangā: *Sector state of play: Resource recovery and waste.*

7. Water and waste: River control and flood protection

River control and flood protection overview

Flood protection networks are located throughout New Zealand, including within the boundaries of many highly populated urban areas. Flood protection schemes are broadly allocated into four types. These are:

- rural drainage (getting excess water off productive and inhabited land and into a watercourse),
- flood control (keeping unwanted water in watercourses, in both rural and urban settings),
- river management (keeping rivers functioning in situ), and
- tidal inundation (keeping seawater off land).

Flood protection infrastructure schemes include stop-banks, floodgates, pump stations and spillways. The total replacement value of the 367 flood protection schemes throughout New Zealand is estimated to be \$2.3 billion. These schemes currently provide an estimated annual benefit of over \$11 billion each year, over five times the capital replacement value of the schemes.

Over a hundred towns and cities across New Zealand have communities living on flood plains, that are protected by flood protection schemes. In total, river and flood protection schemes protect around 1.5 million hectares of land or 5% of New Zealand's land area.

Crown-owned and related assets (rail, state highways, communication and electricity transmission, hospitals, and education facilities) all receive flood protection at a cost to regional and targeted local ratepayers, with little contribution from the Crown.

Sector players

The main sector players are **regional councils** who own most but not all river control, flood protection and drainage infrastructure.

New Zealand has 16 regional and unitary councils. Te Uru Kahika is the identity for the regional sector's collective efforts. These 16 councils are charged with the integrated management of land, air, and water resources, supporting biodiversity and biosecurity, providing for regional transport services, and building more resilient communities in the face of climate change and natural hazards.

The regional sector is powered by scientists, engineers, technicians, kaihautū, planners, project managers, land managers, technology specialists, and community relations officers working on some of the most pressing issues of our time. They have extensive knowledge of the catchments and communities they work in, as well as a strong connection to Te Ao Māori, reflected in the decisions that are made.

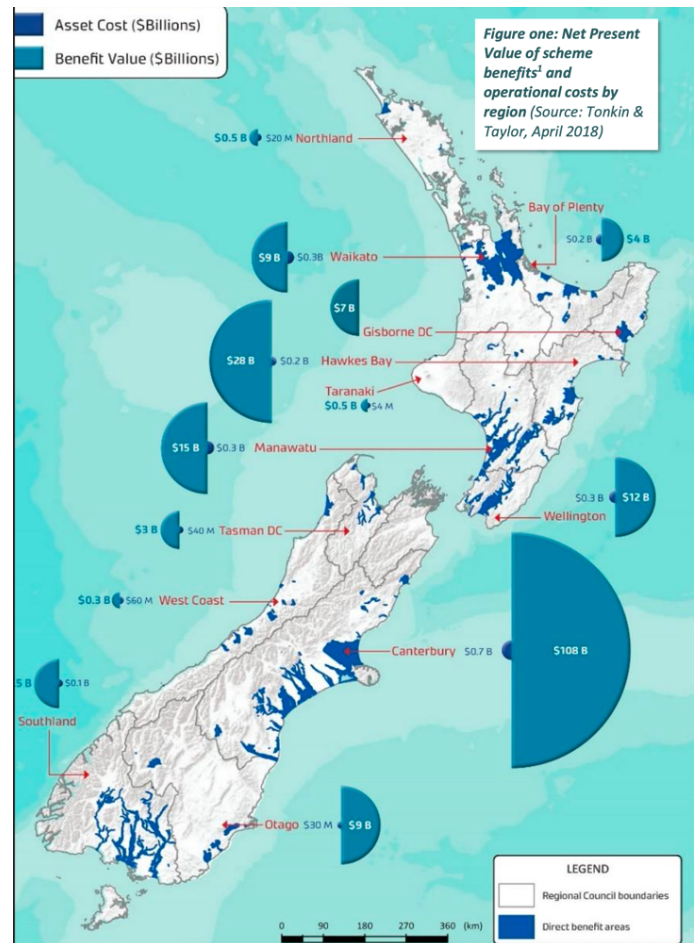


Figure 11: Flood protection asset costs and benefits

Regional sector coordination and input into national direction setting is crucial. As a collective, Te Uru Kahika works together to apply its expertise and local knowledge for the wellbeing of our environments and communities.

The **River Managers Group** provides best practice guidance, workshops, and webinars to the sector.

The **Office of the Auditor-General** audits the local government sector asset management evidence to support LTPs.

Central government currently has just two roles with effect on the protection of communities from flooding. Firstly, it has an enabling role - to ensure regional councils have the legislative power to manage hazards, including flooding. This legislation includes the LGA, RMA, CDEM Act, Soil Conservation and Rivers Control Act 1941 and the Drainage Act 1908.

Secondly, when an event occurs of a size beyond local government’s ability to cope, central government assists with response measures. It also provides financial assistance to speed up recovery.

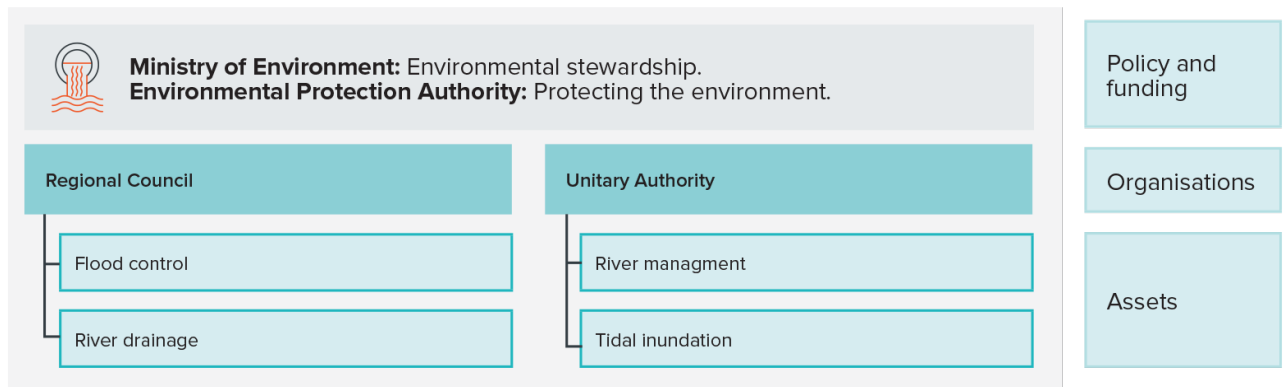


Figure 12: Sector players, River control and flood protection

Infrastructure asset performance

Limited summarised information is available across river control and flood protection assets. Regional councils report asset performance in their activity management plans but metrics are inconsistent and not universal.

Local government is required to establish and report on asset levels of service and performance under the LGA. The Act was amended in 2012 to bring in mandatory non-financial reported performance measures, intended to align performance measures and improve asset performance reporting practices.

River control and flood protection infrastructure has not been sufficiently invested in over the past years, which would indicate that we do not have enough infrastructure in place to adequately protect our other infrastructure and our communities. Regional council research indicates the current 367 flood protection scheme structures have generally been well maintained and managed in a prudent and efficient manner. Currently, flood damage is in most cases avoided because of the efficacy of existing flood protection schemes.

Without further investment in flood protection schemes, the risk of communities facing flooding will be exacerbated, and insurers will increase the premiums they charge for protecting flood prone areas. In some instances, insurers may withdraw coverage.

Sector challenges

Flooding is the number one natural hazard in Aotearoa. New Zealand now faces, on average, one major flood event every eight months. Flood protection schemes are the first line of defence. They provide

protection to around 1.5 million hectares of our most intensely populated and used land. They also provide safety, security and protection to the families, marae, livelihoods, and communities living alongside our rivers in over a hundred towns and cities.

Meeting increasing environmental standards and customer expectations

Regional councils know the flood protection schemes of the future must satisfy a wider spectrum of community, environmental, cultural, climate change and economic objectives to resolve resilience challenges.

The way of doing business for flood risk management has changed over time and shifted focus. Historically, flood protection and control were undertaken through engineering solutions, using civil assets to control the watercourse. With the primary purpose moving water quickly away/downstream. The approach has been changing to more holistic risk management, with the benefit of allowing for natural river processes to occur.

Planning for, funding, and delivering major renewal programmes

Regional council current annual maintenance and capital investments in flood protection schemes total close to \$175 million. This is not a sufficient level of investment to provide for the level of security desired and now required by New Zealand communities. Regional councils intend to increase their investment by a further \$25 million in future years to total \$200 million. This will not be enough. They estimate the annual capital cost of building further resilience into flood protection schemes would be at least \$150 million beyond their current intention.

Funding and providing infrastructure in major growth areas

Population growth and changing demographic profiles will have significant implications for how we manage flood events. Increase in urban growth and intensification could lead to pressure for flood protection in flood prone areas to offset the increased consequence when floods occur. Alternatively, more people could seek a more rural lifestyle or increasing protection of agricultural and horticultural land will increase pressure on rural flood management systems.

Funding to address climate risks

Aotearoa is experiencing more frequent and intense rainfall events and higher river flows due to climate change. Major flooding events have the potential to cause millions of dollars of damage to rural and urban communities.

Strengthening partnerships with iwi and hapū

Recognising mana whenua are kaitiaki of the waterways in their rohe, flood schemes must continue to work with iwi and hapū through flood protection programmes.

Resilience of networks and organisations

To ensure continued service provision following disasters, shocks, and stresses and to cope with climate-change induced weather changes, including more severe flooding, droughts and sea level rise, flood schemes need to have the appropriate level of resilience.

Legislation and regulation

The National Policy Statement for Freshwater 2020 provides local authorities with updated direction on how they should manage freshwater under the RMA. Regional councils are required to prepare LTPs under the LGA (Section 10) with AMPs. The RMA requires resource consents for flood control activities, regional policy statements and spatial planning.

The Soil Conservation and Rivers Control Act 1941 makes provision for the conservation of soil resources, the prevention of damage by erosion and to make better provision for the protection of property from damage by floods. The Land Drainage Act 1908 describes the duties of territorial authorities for the provision and maintenance of drainage schemes in New Zealand. The Rivers Boards Act 1908 is the legacy act which enabled river boards to undertake physical works to manage rivers and river systems.

Industry guidance

Industry guidance for this sector includes:

- National Policy for Freshwater Management
- National Policy Statement for Flood Risk Management (proposed)
- Managing Flood Risk – A process standard, NZS9401: 2008
- Dam safety guidelines are used for flood protection structures, in lieu of any other industry requirements or standards.

Water NZ provide a set of online resources including past conference papers, and Āpōpō have recently developed a series of [Flood Management](#) digital badge online training courses.

River control and flood protection asset management maturity

Regional councils are generally operating at a reasonably high level of asset management maturity. Having been subject to the LGA means they have had AMPs in place for decades and these are getting quite sophisticated in some jurisdictions. There are some inconsistencies, but asset management maturity is assessed largely using the IIMM maturity assessment method and some authorities have been undertaking them for multiple years.

Roles and responsibilities are generally understood, and improvement actions are included in AMPs. AMPs may be developed for each asset group independently or for the regional set of infrastructure. A Tonkin and Taylor review of AMPs in 2018 detailed a range of asset management maturity across the country with a split identified between the larger councils (assets greater than \$150 million replacement value) meeting or nearly meeting a core rating with councils with assets less than this value sitting in the basic range.

An overall summary of sector maturity is presented in Table 7.

Asset Management function	Maturity	Overview of current practice
Strategic direction	Core	Strategic direction setting occurs as part of the activity management planning process. Flood protection infrastructure is subject to multiple pieces of legislation and guidance with their own objectives which all need to be aligned.
Levels of service	Basic	Levels of service are set to meet legislative requirements, meet LTP requirements, to provide protection from floods, manage the capacity of rivers and provide environmental protection and manage erosion. Community consultation occurs through the LTP consultation processes. Levels of service are not consistent across the country.
Demand	Basic	Demand forecasting considers a broad range of inputs and is very connected to land use change, climate considerations, and changing legislation. Increasing frequency and severity of weather events, drought or sea level rise is a major consideration for demand on flood protection infrastructure.
Evidence	Core	A mixed approach to evidencing the need for investment across regional councils. The LTP process captures the asset condition and need for investment.
Risk	Basic	Risk is discussed in AMPs and in LTPs but does not seem connected to levels of service. Asset criticality has mixed use across the country but is becoming more common.

Asset Management function	Maturity	Overview of current practice
Operational planning	Basic	Operational planning and decision making has a mixed level of sophistication with some councils applying a risk-based approach to operations and maintenance tasks. Generally good information is recorded about completed work and response to maintenance issues, which is used to inform longer term decisions.
Capital planning	Core	Capital works are typically created at the scheme level and aggregated to a regional programme to improve existing assets or create new ones. Renewals planning centres on rehabilitation or replacement of assets using a range of different approaches, from simple age-based models to more complex planning techniques. New assets to deal with legislative changes, growth and levels of service change are built by Councils who may also receive vested assets from developers.
Financial forecasts	Basic	A key challenge is securing funding through the AMP and LTP process when competing with other services provide by Council. Thirty-year forecasts are prepared as part of Infrastructure Strategies in the LTPs.
Asset management plans	Core	Councils follow the LTP cycle producing AMPs and LTPs every three years. Some regional councils have taken a longer-term approach to their planning cycles considering the nature of their infrastructure and issues that affect them, up to fifty years.
People	Basic	Capability and capacity are a significant issue for regional councils. Recent recruitment is generally not attracting experienced candidates. There is emerging leadership for this sector through the LGNZ Te Uru Kahika group.
Service delivery	Core	A mixture of outsourced and in-house resources is used to deliver this activity.
System and improvement	Basic	Process documentation and quality management has become an increasingly important issue as staff turnover increases and knowledge is lost when key staff leave. Regional councils have asset management improvement programmes in their AMPs.

Table 7: Asset management maturity, River control and flood protection

River control and flood protection funding

Flood protection is generally funded through general rates or targeted scheme rates based on the amount of protection benefit each ratepayer receives. There is consensus that this approach is not going to be a sustainable way to fund the level of resilience this infrastructure will need in the future.

Regional council maintenance and capital investment in flood protection schemes is looking to increase by \$25 million in future years to a total of \$200 million per year. This is not a sufficient level of investment to provide for the level of security desired and now required by New Zealand communities. They estimate the annual capital cost of building further resilience into flood protection schemes would be at least \$150 million beyond their current intentions.

For the past three decades, Crown-owned and related assets have received flood protection at a cost to regional and targeted local ratepayers, with little contribution from the Crown.

A business case was put forward to central government to ask for a co-investment funding model to be considered for this sector, but was rejected in 2023.

Recommendations for river control and flood protection

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to water & waste: River control and flood protection
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There is currently no lead for asset management in this sector, although the River Managers Group helps facilitate better asset management practice.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is often in place for local authorities, but not always.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Maturity improvement is required in this sector; especially as the criticality of the assets is high.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: There is little reporting on performance measures in this sector, so development of some simple and consistent measures would enable benchmarking.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: This is important to provide the public with surety on the stewardship of these critical assets.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: This is important and central government co-funding is relevant.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination, especially the

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to water & waste: River control and flood protection
		coordination with other infrastructure that impacts on flood control such as bridges.

Further areas for the river control and flood protection to focus asset management improvement are:

1. Clear roles and responsibilities are needed between central, regional, and local government.

Management of river control and flood protection infrastructure alongside stormwater drainage assets is a complex, multi-organisational task which would benefit from clearer delineation of who does what between the various layers of government.
2. Consistent levels of service and asset performance measures are required to build a national picture of asset condition and level of service achievement.

Without a common way of reporting condition, it is difficult to get a national picture of this infrastructure class.
3. A centralised repository of asset information and method to nationally prioritise investment in flood protection is required to mitigate the significant risk that flooding poses to other critical infrastructure.

A risk-based approach to investing in flood protection across the country will help prioritise resources to deliver the most benefits.

River control and flood protection reference documents

- Infrastructure Commission, Te Waihanga: *Water Sector State of Play Discussion Document*, 2021
- IPWEA: *International Infrastructure Management Manual*
- LGNZ: [Central Government Co-investment in Flood Protection Schemes](#)
- National Adaptation Plan: [Adapt and thrive: Building a climate-resilient New Zealand.](#)
- Resilient River Communities: [Hiding in Plain Sight.](#)

8. Water and waste: Irrigation

Irrigation sector overview

There are approximately 50-60 irrigation schemes in New Zealand, mostly in the South Island. In total, 900,000 hectares of land is irrigated. This is about 7% of farmed land. An estimate of the New Zealand wide value of irrigation assets is approximately \$2 billion. The schemes are predominantly farmer co-operative owned. Prior to the 1980s, the Crown-owned several schemes, but all of these have been divested and are now privately-owned. Assets can be categorised into three major areas – capture, conveyancing, and control.

Sector players

MBIE has regulatory powers and checks the safety of dams in the irrigation schemes.

Irrigation NZ is the national body for irrigation schemes, though not all schemes are members. Irrigation NZ has good practice guidance and training though it contains minimal asset management guidance.

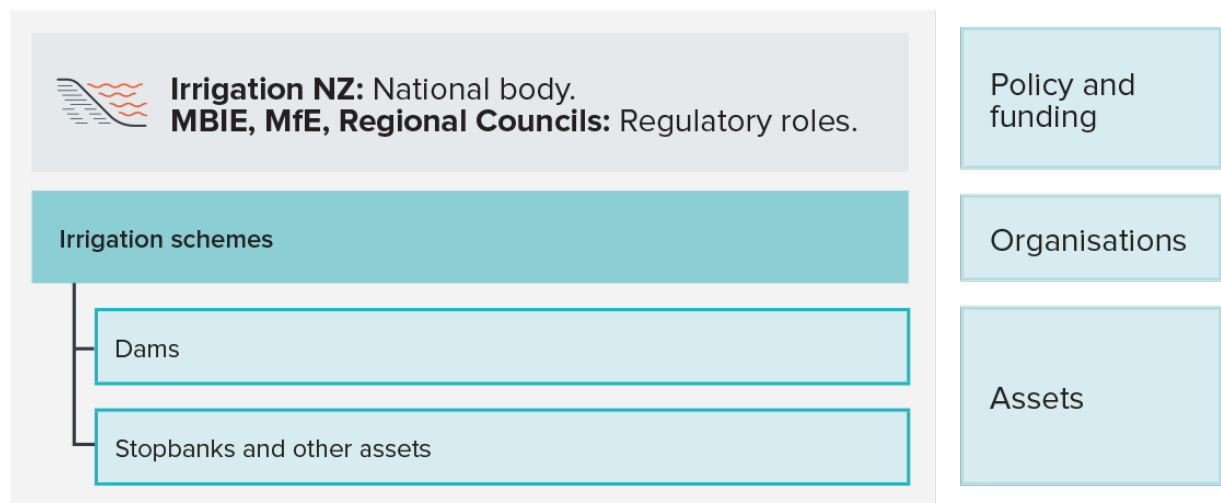


Figure 13: Sector players, Irrigation

Infrastructure asset performance

While asset management maturity is relatively basic and weak in the sector, there is a close relationship between the owners of irrigation schemes and the operation of the schemes. This ensures that assets do provide the services that are demanded of them at an operational level. More complex irrigation monitoring equipment is becoming available, and this will demand a higher standard of asset management.

Sector challenges

The sector issues identified are:

- limited asset management capability in most of the smaller schemes.
- lack of consistent asset management data across the sector.
- increasing investment in monitoring equipment to determine whether capital investment or other preventative measures are required, and to optimise control of water flows.
- lack of asset investment in sector.
- lack of a central water strategy at a policy level

- some regional differences in approach to asset management.

Irrigation asset management drivers

Legislation and regulation

There are no statutory requirements around asset management for irrigation schemes. Asset management is influenced by environmental requirements.

Industry guidance

While Irrigation New Zealand has guidance for schemes in many areas of irrigation management it provides little asset management guidance. In 2013 a template was developed by Irrigation NZ for asset registers for schemes. This was followed up in several workshops. However, this does not appear to have been implemented scheme wide.

Irrigation asset management maturity

Apart from several larger schemes the level of asset management maturity across the sector is low.

After a meeting with the Technical Director of Irrigation New Zealand in late January 2023, Irrigation NZ sent out an asset management survey to schemes using the questionnaire that was developed for the Asset Management State of Play assessment. Although the number of responses was relatively low, and are likely to have been from more mature organisations, our interpretation of the findings of the survey are included in the table below.

Asset management function	Maturity	Overview of current practice
Strategic direction	Basic	In several large schemes there is organisational commitment to asset management and that asset management is important to achieving organisational goals. Other smaller schemes struggle.
Levels of service	Basic	Levels of service performance measures are not formally present, although the performance of assets is analysed due to the close connection between scheme owners and scheme operators.
Demand	Basic	Business planning includes forecasts of demand and changes in service expectations.
Evidence	Basic	Asset registers are at the lower end of adequate in terms of completeness, accuracy, and usefulness.
Risk	Basic	Risk management and resilience planning is relatively "hands on" and not always formalised.
Operational planning	Basic	The schemes by and large plan and manage their operational activities commensurate with the various size of the schemes.
Capital planning	Basic	Lifecycle planning (including capital) is prevalent in many schemes.
Financial forecasts	Basic	The larger schemes have financial forecasts in place, but it is unknown how extensive long-term forecasts exist in smaller schemes.
Asset management plans	Basic	Some schemes have AMPs or asset management policies in place, but these are probably the more proactive entities.
People	Basic	Capability and capacity sufficiency is seen as an issue for a significant number of schemes.
Service delivery	Basic	Outsourcing and supply partners generally support asset management.
System and improvement	Aware	This is seen as a weak area, with little documentation of a systemised management of assets, and little improvement planning or action.

Table 8: Asset management maturity, Irrigation

Irrigation funding

Funding of schemes is predominantly from co-operative owner members. The Waimea Community Dam is a CCO of the Tasman District Council. Council is financing a significant share of the development.

Recommendations for irrigation

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Irrigation
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: This will provide an asset management lead for the sector as not all irrigators are members of Irrigation NZ. The system lead role would provide support for the improvement initiatives currently undertaken on a voluntary basis by Irrigation NZ.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is often in place for local authorities, but not always.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Maturity improvement is required in this sector; however, the target level may be lower than some other sectors.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: There is little reporting on performance measures in this sector, so development of some simple and consistent measures would enable benchmarking.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: AMPs are not widely used, but if required they would need to be at a core level only.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to Water & waste: Irrigation
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: The consequences of failure in an extreme event are high for irrigation activities. Investment in adequate resilience should be a high priority.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A higher level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Irrigation sector asset management is relatively weak. While there are pockets of good practice, asset management across the sector needs to be improved to ensure there is efficient and sustainable delivery of water. Further recommendations for the sector are:

1. Encourage Irrigation New Zealand to promote good asset management practices to all its member schemes via workshops.

There is a need to improve asset management practices across all irrigation schemes and Irrigation New Zealand is seen as the best body to guide the sector.

2. The more advanced and substantial schemes should play a role in monitoring and supporting the smaller and less resourced schemes.

Allied to the previous recommendation, an efficient way to transfer asset management knowledge and practice is to have the more advanced schemes assisting the smaller schemes.

Irrigation reference documents

- Irrigation New Zealand: [New Zealand Irrigation Overview](#).

9. Transport: Local roads

Local roads sector overview

The local road network is spread over an urban and rural area, and has been steadily growing over time. At the end of the 2020/21 financial year there were 85,890 kms of local roads valued at \$83 billion, of which 54,140 were sealed and 31,750 were unsealed. This is the largest value sub-sector analysed in this report.

Sector players

Local roads are owned and managed by **local government**, with government policy and oversight through the Department of Internal Affairs.

There are 67 local authorities who are **Road Controlling Authorities (RCAs)**, comprising of 50 district councils, 11 city councils and six unitary councils. The **Department of Conservation (DoC)** is an RCA who manages local roads in specific locations such as Mount Cook Village.

Regional Councils also contribute to this sector, by managing public transport services on the local road network.

The **Ministry of Transport** plays an important role in this sector, setting the Transport Outcomes and overall available budget for local roads as part of the Government Policy Statement on land transport (GPS). The **New Zealand Transport Agency Waka Kotahi (NZTA)** has significant influence over this sector, setting policy, strategy, and investment priorities for local roads. NZTA investment advisors work with the RCAs to manage investment in local roads.

Most physical works activities are outsourced to network maintenance and capital works contractors, through a broad range of contract models, ranging from traditional measure and value type arrangements to collaborative style contracts and alliances.

The local roads sector is also supported by a range of **industry organisations** which contribute to the asset management and investment prioritisation of the local roads network.

[Te Ringa Maimoa – Transport Excellence Partnership](#) (formerly the Road Efficiency Group) provides support and guidance to the local roads sector through promoting best practice activity management, reporting at an RCA level, performance reporting, asset management maturity reviews, competency assessment, data quality and evidence-based insights.

The [RCA forum](#) – enables the exchange of information and provides updates on proposed legislation, new standards and guidelines, highway and procurement strategies and other issues relevant to RCAs.

The Āpōpō special interest group, [Roading Infrastructure Management Support Group](#), provides leadership, strategic advice, and promotion of best practice to ensure consistency and efficiency across New Zealand roads.

[Infrastructure Decision Support](#) is a subsidiary of Āpōpō and provides evidence-based strategic support to asset infrastructure management professionals and councils around the country.

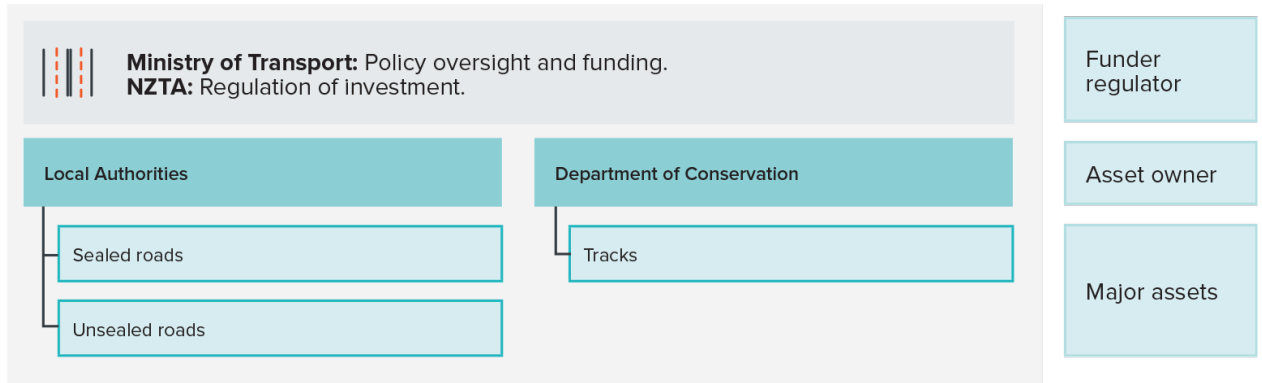


Figure 14: Sector players, Local roads

Infrastructure asset performance

Asset performance for local roads is monitored by Te Ringa Maimoa through the [Transport Insights](#) online portal⁷. Performance is monitored through a series of lenses including RCA, transport outcomes, and asset condition.

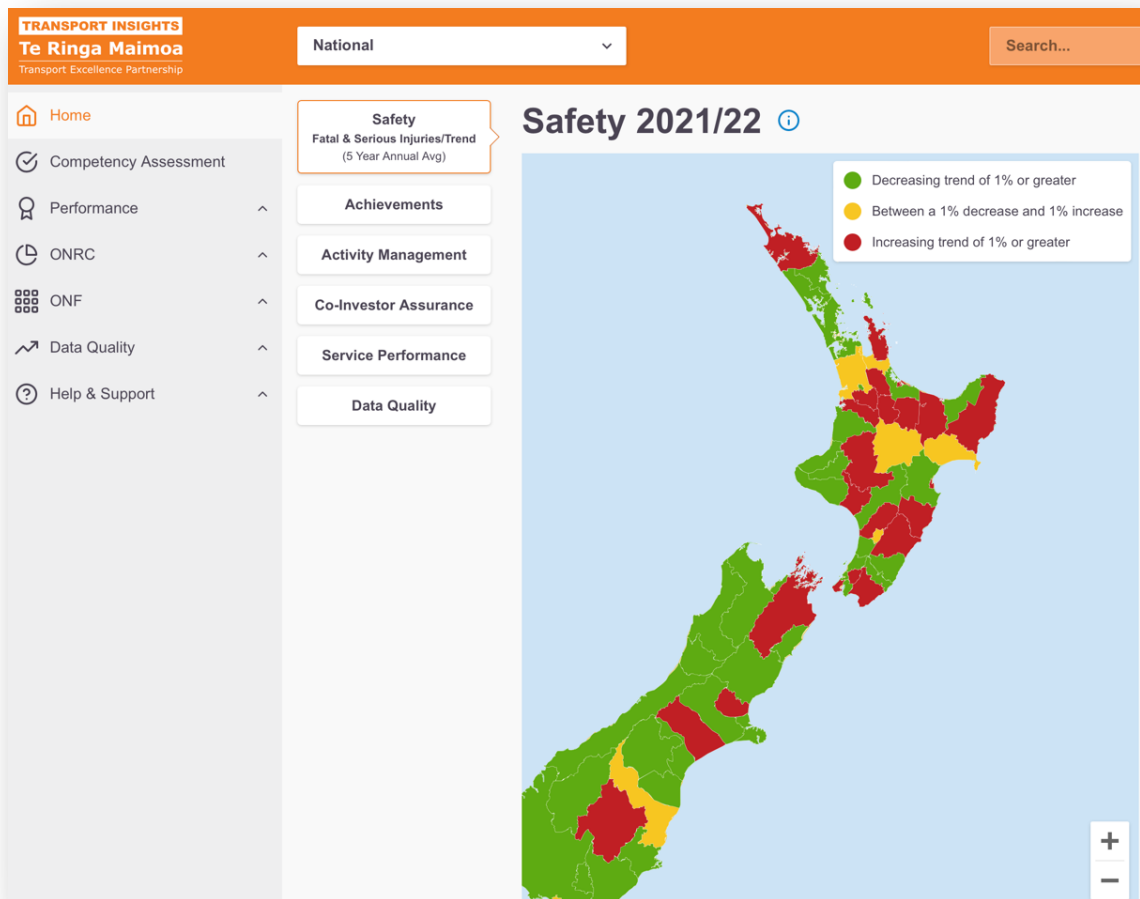


Figure 15: Transport insights portal

⁷ [Transport Insights web portal | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](#)

Sector challenges

The sector faces real challenges in trying to manage a large, dispersed network of roads built on variable terrain that service a large but sometimes sparse population. At present the major challenges are:

- continuing to deliver the expected level of service in a fast-escalating cost environment,
- funding and providing new road infrastructure in major growth areas, including the ability to utilise the development contribution process to fund growth costs
- balancing the demand of movement (people, goods, services) as an outcome across transport modes (active, road, rail, sea),
- being able to afford to continue to provide road access to sparsely populated areas which may be declining in population,
- dealing with the flow-on effect of high prices, which means higher asset valuations and increased depreciation, increasing operational expense and impacting rates,
- securing sufficient operational expenditure to deliver effective maintenance,
- responding to damage incurred on the local road network following disasters, which is largely not budgeted for,
- planning for and coping with climate-change induced weather changes (more severe flooding, droughts, sea level rise) and adapting the road network infrastructure to be more resilient,
- managing the potential retreat of some roads as coastal townships are reacting to climate change threats,
- finding people with the appropriate skills both to improve asset management practices and deliver infrastructure investment programmes, and
- securing sufficient resource to deliver work in a competitive way. Procurement is a large burden of effort for smaller RCAs which are currently not receiving large numbers of tender responses.

Local roads asset management drivers

Legislation and regulation

Local government was the first sector in New Zealand (and probably internationally) to legislate key aspects of asset management practice. In the late 1990s, a requirement to produce long-term financial plans was the first step away from annual 'budget to budget' planning which often saw maintenance and renewals deferred with lack of understanding of longer-term implications (LGA Amendment 1998).

NZTA is a Crown Agent mainly governed by the Land Transport Management Act 2003 (LTMA). NZTA play a key role in setting the Investment Management Framework that determines priority for investment.

The LGA required ten-year Long-Term Council Community Plans (now LTPs), stating levels of service, expenditure requirements and other elements of asset management for a period of ten years. The expectation was that AMPs would provide the evidence base for activities with a large asset base.

The Ministry of Transport sets the transport outcomes that the sector aims to deliver. There are many other related areas of regulated practices such as the DIA non-financial performance reporting, and environmental regulation through the MfE and regional councils.

Industry guidance

Te Ringa Maimoa, the Transport Excellence Partnership, is a major provider of best practice guidance in the asset management space.

Āpōpō played a key role in advocating for legislative change (LGA and amendments) and supporting the development of asset management practices to meet the legislative intentions. This has largely been through the IIMM and other guidelines, supported by training programmes.

The Office of the Auditor-General has been a key partner in this work, and has been instrumental in helping to drive asset management improvement in the local government sector.

Despite all the above, the sector still varies in maturity, with many councils struggling to deliver asset management improvement programmes. Councils are responsible for funding, planning, regulating, and delivering transport infrastructure at the local level. They contribute to Regional Land Transport Plans (RLTP), which are approved by regional councils and which NZTA considers when preparing the National Land Transport Programme (NLTP).

Local roads asset management maturity

Te Ringa Maimoa performs asset management maturity assessments of every transport activity management plan for local authorities across the motu.

Assessment of the 2021 set of plans showed that 100% of local authorities had a fit for purpose activity management plan, and the overall score for the local road sector had increased from 1.99 to 2.15 from the 2018 to 2021 round of AMPs.

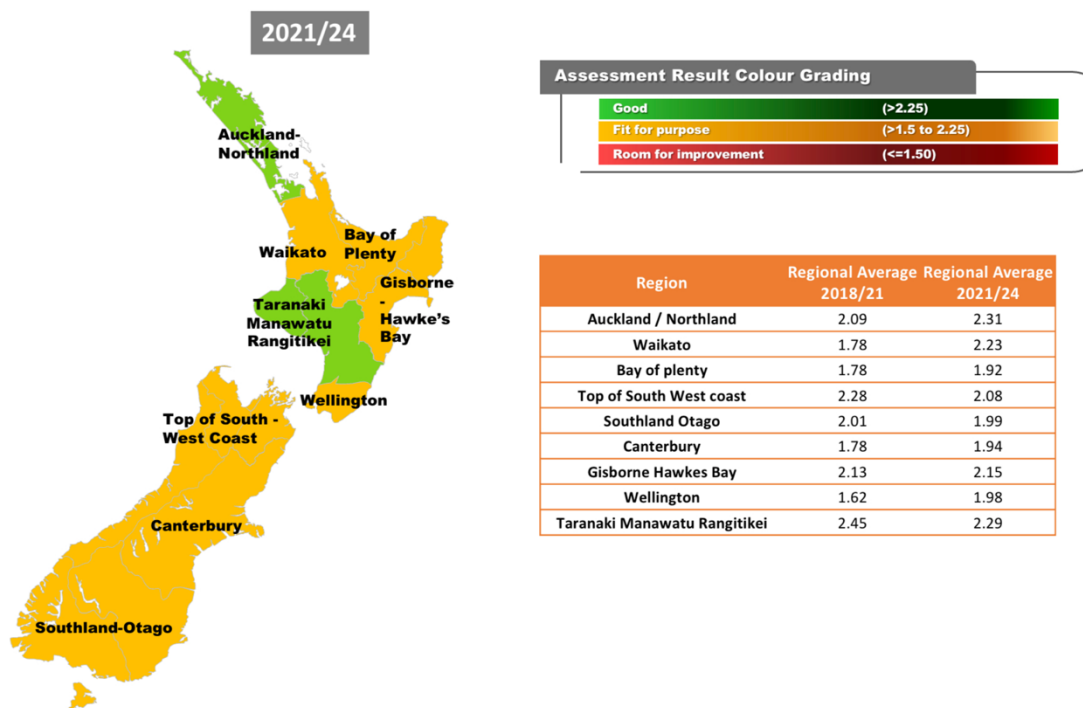


Figure 16: Activity management plan review ratings, local roads

An overall summary of sector maturity is presented in Table 9.

Asset management function	Maturity	Overview of current practice
Strategic direction	Intermediate	Strategic direction setting occurs as part of the development of the activity management planning process. The Business Case Approach includes development of a strategic case identifying the problem statement and benefits that will be realised through problem solving. Local authority RCAs align their transport activities to Transport Outcomes set by the government and community outcomes set by elected members.

Asset management function	Maturity	Overview of current practice
Levels of service	Intermediate	Mandatory performance measures are set by the DIA, though these do not provide a comprehensive framework for levels of service monitoring. Te Ringa Maimoa is developing a Differential Level of Service Framework for Local Authorities that will provide a consistent framework. Community consultation mostly occurs through LTP consultation processes; specific level of service/cost debate usually occurs only at the council level, supported by varying quality of level of service options analysis.
Demand	Core	Demand forecasting is commonly limited to population and household growth forecasts without contemplation of the impact of demand on the various modes of transport. Some traffic demand models have been developed at regional levels but the complexity and cost of running scenarios in these is limiting the use of sophisticated demand analysis.
Evidence	Intermediate	Te Ringa Maimoa produces a data quality report which provides confidence to the investors that the evidence provided is of sufficient quality to assist with informed decision making. The transport sector has a single asset management information systems which has been in place for multiple decades providing stability of information sets and processes. A project is underway to align the data sets used across the country into a consistent set. The Asset Management Data Standard project being led by NZTA has commenced and is rolling out to all RCAs. Condition assessment programmes are currently mixed across the country, but Te Ringa Maimoa has a project underway to deliver consistent condition data collection for all local authority RCAs.
Risk	Basic	Risk is being incorporated into the Te Ringa Maimoa Differential Level of Service Framework. Asset criticality has mixed use across the country but is becoming more common.
Operational planning	Intermediate	Operational planning and decision making is often led by supply chains partners, but a trend lately is for the asset owners to take more responsibility in the decision-making process. Generally good information is recorded about completed work and response to maintenance issues, which is used to inform longer term decisions.
Capital planning	Intermediate	Renewal forecasts for major investment categories such as road surfacing and pavement renewal are typically based on some form of predictive modelling. Other asset type plans may be based more on engineering judgement. IDS provides support for project development to many RCAs utilising the dTIMS tool which has been developed for NZ roads. Improvement projects are typically co funded with NZTA and subject to their capital investment planning processes, but balancing investment from two parties can mean a lot of programme changes as budgets are sought and approved.
Financial Forecasts	Intermediate	Ten-year financial forecasts are in place for all RCAs. A key challenge is securing funding through the AMP and LTP process from council and NZTA concurrently whilst enabling transparent budget prioritisation. 30-year forecasts are prepared as part of Infrastructure Strategies.
Asset management plans	Intermediate	Fit for purpose AMPs are in place for all RCAs.
People	Intermediate	Capability and capacity are a significant issue. Recent recruitment is not attracting the appropriate calibre of candidates, and the sheer number of RCAs creates a competitive internal market. There is good leadership of the asset management local road community through Te Ringa Maimoa Learning and Development programme which facilitates an annual series of workshop and webinars.
Service delivery	Core	Most service delivery is outsourced through a variety of contract models. Inconsistent service level delivery through the different contract models makes it hard to compare delivery across RCAs.
System and improvement	Core	Process documentation and quality management has become an increasingly important issue as staff turnover increases and knowledge is lost when key staff leave. All RCAs have asset management improvement programmes in their AMPs.

Table 9: Asset management maturity, Local roads

Local roads funding

Funding of local road activities is through co-investment between local and central government. NZTA subsidises local road maintenance and improvements.

Funding assistance rates are the contribution, in percentage terms, that NZTA make from the National Land Transport Fund (NLTF) to approved organisations for the delivery of an activity or combination of activities. Funding assistance rates are not subsidies, but part of a co-investment system which recognises there are both national and local benefits from investing in the land transport network.

Local share is the percentage of funding for an activity that is provided by the approved organisation.

NZTA have established a Business Case Approach to managing investment on the transport network. The Treasury Better Business Case model has been adapted by NZTA to suit the nature of the ongoing programmes of work needed to maintain and operate a transport network. Funding requests to NZTA include the principles of the Business Case Approach of identifying problem statements and benefits that will be realised from solving these problems. NZTA uses an online portal, Transport Investment Online to manage the funding request and approval process.

Recommendations for local roads

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: local roads
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	Medium relevance: NZTA already fulfils this role for local authority roads but not across all infrastructure types.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is often in place for local authorities, but not always.
	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This activity is partially provided by the RIMS maturity assessment; however, it is not mandatory for all local authorities.
Transparency	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: Local authorities are already required to report on consistent asset performance measures specified by NZTA.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: AMPs are required and reviewed by NZTA, but they are not always made publicly available.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: local roads
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: The consequences of failure in an extreme event are high for road activities. Investment in adequate resilience should be a high priority.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Further recommendations for the local roads sector are:

1. NZTA should implement changes to the level of service model to consider cost, service, risk, and emissions for every significant decision for local road maintenance, operations, renewal and capital investment.
This will improve the consideration of emissions and risk for investment planning in local roads.
2. Consider introducing more shared services, similar to the consistent condition data collection project led by NZTA, across local authorities.
This recommendation aims to reduce the skills shortage in the local government transport teams by providing more efficient shared services. Similar asset management tasks are being completed independently, which could be combined into regional or national delivery models to make the most of precious resources. The Waikato Regional Asset Technical Accord (RATA) is a good example of regional collaboration.
3. Reporting of local road performance should be aggregated to regional and national ratings through use of the Te Ringa Maimoa Transport Insights tool.
A performance framework for local road including levels of service, and management reporting will make regional and national planning more efficient and enable identification of trends.
4. Review the level funding of local road infrastructure required to sustain an acceptable state of local road infrastructure.
Paying for the maintenance, renewal, and improvement of local roads through the NLTF and local property rates is becoming less sustainable, as costs increase through inflation and reduced revenues impact on the ability of the NLTF to afford the required investment.
5. Standardise technical specifications, levels of service and local road design standards.
Local road standards have diverged over time and now are complex and cumbersome to deliver. Standardisation will assist with national consistency and delivery efficiency.

Local roads reference documents:

- Office of the Auditor-General: *LTP findings, 2021*
- Infrastructure Commission, Te Waihanga: *Transport Sector State of Play Discussion Document, 2021*
- NZTA – *Business Case Approach*.
- *He piki tūranga, he piki kotuku – The future for local government* [Future for Local Government Review - dia.govt.nz](https://dia.govt.nz).

10. Transport: State highways

State highways sector overview

The state highway network includes the main trunk roads in New Zealand, that perform a nationally strategic purpose in moving people and goods nationwide.

At the end of the 2020/21 financial year there were 11,071 kms of state highways, of which 11,040 kms were sealed and 31 kms were unsealed. The sealed network has been growing slowly since 2016 and the unsealed network has been very slowly shrinking by about 1 km per annum, over the last ten years.

The state highway network was valued at over \$74 billion at the end of the 2020/21 financial year.

Sector players

State highways are controlled and managed by the **NZTA**.

NZTA has a regional structure with five Directors of Regional Relationships, who build, maintain, and enhance the NZTA strategic alignment and reputation within a specific geographical boundary.

NZTA takes a system-based approach in each region to join up state highways and local roads, and to focus on journeys across the transport network.

Maintenance, operations, and renewals physical works activities are outsourced to network maintenance providers through the Network Outcomes Contract (NOC) model. This contract form is in its second iteration and currently undergoing a review to better align outcomes and delivery. There are 22 NOCs across the country, split amongst the larger contracting companies such as Fulton Hogan, Higgins, Downer, HEB and various special-purpose alliances. Supplier maps are updated and available on the NZTA website⁸.

Capital works and new infrastructure are delivered through a broad range of contract models ranging from traditional measure and value type arrangements through to collaborative style contracts and alliances, and public private partnerships.

The **Ministry of Transport** plays an important role in this sector, setting transport outcomes and overall available budget for state highways as part of the GPS.

The transport sector is supported by a range of **industry organisations** which contribute to the asset management and investment prioritisation of the state highway network.

The [RCA forum](#) – enables the exchange of information and provides updates on proposed legislation, new standards and guidelines, highway and procurement strategies and other issues relevant to RCAs.

The [Āpōpō RIMS](#) provides leadership, strategic advice, and promotion of best practice to ensure consistency and efficiency across New Zealand roads.

[IDS](#) is a subsidiary of Āpōpō and provides evidence-based strategic support to asset infrastructure management professionals and councils around the country.

⁸ [NOC supplier maps | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](#)



Figure 17: Sector structure, State highways

Infrastructure asset performance

Asset performance on the state highways was reported until 2015 in terms of pavement and surface condition indices. Changes to the data measures collected since then have meant performance is not comparable earlier than 2015. The Asset Management Data Standard being rolled out by NZTA will enable enhanced asset performance reporting.

NZTA is developing lifecycle AMPs⁹ for their major asset classes that will summarise asset condition by asset class.

NZTA reports on national pavement condition¹⁰ annually through a series of technical measures that track performance over time.

Sector challenges

The challenges faced by the state highway network are:

- balancing the funding available and achievement of the government's priorities and desired outcomes for the land transport system,
- continuing to deliver the expected level of service in a fast-escalating cost environment,
- responding to damage incurred on the state highway road network following disasters,
- managing the risk of climate-change induced weather changes (more severe flooding, droughts, sea level rise) and adapting the road network infrastructure to be more resilient,
- limiting the growth in congestion on the freight network, particularly in the peak times, and improving the efficiency of connections to major freight hubs,
- providing better travel options and responding to climate change through targeted improvements to public transport, and
- improving safety on our roads and meeting Road to Zero strategy targets.

State highways asset management drivers

Legislation and regulation

NZTA is a Crown Agent mainly governed by the LTMA, the purpose of which is to contribute to an effective, efficient, and safe land transport system in the public interest. The Act sets out requirements for the operation, development, and funding of the land transport system.

⁹ [Lifecycle asset management plans | Waka Kotahi NZ Transport Agency](#)

¹⁰ [National pavement conditions | Waka Kotahi NZ Transport Agency](#)

The Ministry of Transport sets transport outcomes and funding envelopes that the transport sector aims to deliver through the GPS. This makes it clear what the government is aiming to achieve through the transport system and underscores the need for integrated land use planning, urban development, and regional development strategies.

Industry guidance

NZTA have several statutorily independent functions, including determining whether activities are to be included in the NLTP and deciding which activities are to be funded from the NLTF.

NZTA produce industry guidance in the form of investment assessment, traffic management, design standards, and the business case approach.

Te Ringa Maimoa is a major provider of best practice guidance in the asset management space and is a collaborative initiative between LGNZ, NZTA and all RCAs.

State highways asset management maturity

NZTA produce a AMP for state highway investment.

The NZTA investment proposal sets out the activities that NZTA propose to invest in under the NLTP. It includes proposed state highway activities and other activities that they lead on behalf of the sector. It provides context for, and is a key input to, RLTPs. The NZTA investment proposal takes a whole-of-system national view across all land transport modes, to set out their proposed investment activities for inclusion and prioritisation into RLTPs and subsequent inclusion in the NLTP.

An overall summary of sector maturity is presented in Table 10.

Asset management function	Maturity	Overview of current practice
Strategic direction	Intermediate	The NZTA investment proposal includes strategic priorities and other directions from the GPS to ensure the proposed activities give effect to the GPS. The Business Case Approach includes development of a strategic case identifying the problem statement and benefits that will be realised.
Levels of service	Intermediate	The NOC contracts have significant sets of performance measures which are focussed on operational service levels. A review of levels of service is planned for 2023 which will be aligned to the Te Ringa Maimoa Differential Level of Service Framework for Local Authorities.
Demand	Core	Demand forecasting is commonly limited to population and household growth forecasts without contemplation of the impact of demand on the various modes of transport. Some traffic demand models have been developed at regional levels but the complexity and cost of running scenarios in these is limiting the use of sophisticated demand analysis.
Evidence	Intermediate	Te Ringa Maimoa produces a data quality report which provides confidence to the investors that the evidence provided is of sufficient quality to assist with informed decision making. The transport sector has a single asset management information system which has been in place for multiple decades providing stability of information sets and processes. A project is underway to align the data sets used across the country into a consistent set. The asset management data standard project has commenced and is rolling out to all state highway networks. NZTA undertakes a national programme of high-speed data collection across the state highway network and has done for multiple years, building a good set of trend-based data.
Risk	Basic	Risk is a major consideration in the NOC contracts and is for the most part is shared between principal and supplier. Risks are considered at a network and project level.
Operational planning	Intermediate	Operational planning and decision making is often led by NOC contractors who deploy maintenance management plans for each network. Generally good information is recorded about completed work and response to maintenance issues, which is used to inform longer term decisions.

Asset management function	Maturity	Overview of current practice
Capital planning	Intermediate	Renewal forecasts for major investment categories such as road surfacing and pavement renewal are typically based on predictive modelling. Tension is placed on renewal programmes at the network level by NZTA asset integrators who test renewal treatments for lifecycle efficiency. Improvement projects are subject to capital investment planning processes and the full business case model.
Financial forecasts	Intermediate	The NZTA investment proposal takes a whole of system view across all the transport modes across the whole country.
Asset management plans	Intermediate	Lifecycle AMPs are beginning to be developed nationally for asset classes with a low level of maturity currently. The state highway AMP is normally developed to summarise the investment required over 10 years to align with the NLTP period
People	Intermediate	The Te Ringa Maimoa asset management competency framework provides a way for all asset management professionals to assess their current skill levels against a standard set of criteria. NZTA have also developed a competency framework more aligned to operational asset management responsibilities.
Service delivery	Core	The NOC contract model is currently in review to try and better align outcomes to contract deliverables.
System and improvement	Core	Process documentation and quality management has become an increasingly important issue as staff turnover increases and knowledge is lost when key staff leave. Asset management maturity is a large-scale operation for the state highway network, roles and responsibilities need to be clearly understood and improvements mapped at a high level.

Table 10: Asset management maturity, State highways

State highways funding

The NLTF is a ring-fenced transport fund which includes petrol excise duty, road user charges, a portion of annual vehicle licensing fees, and income from the sale and lease of state highway property. The NLTF is administered by NZTA, and all the revenue that goes into the fund is spent on the land transport system through the NLTP.

The NLTP is the key commitment with the sector for how NZTA will use national land transport funding to provide all users of the transport system with a safe, integrated network they can rely on.

NZTA have embraced a Business Case Approach to managing investment on the transport network. The Treasury Better Business Case model has been adapted by NZTA to suit the nature of the ongoing programmes of work needed to maintain and operate a transport network.

Recommendations for state highways

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: state highways
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: The Ministry of Transport fulfils some of this role, however it does not include asset management oversight.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for	Low relevance: The state highway network is core business for NZTA, and it has adequate governance for asset management in place.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: state highways
	asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This activity was provided by Treasury as part of the ICR, but is no longer undertaken. Given the criticality of the state highways to New Zealand it is important to verify a continued high level of asset management maturity.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: NZTA report on asset performance measures but these are not easily comparable with other sectors.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: AMPs are developed and made publicly available by NZTA.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: The GPS sets the priorities for NZTA to follow which include increasing resilience
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Further recommendations for state highways are:

1. Develop common levels of service across the transport sector to assess investment suitability for all the transport modes.

At present levels of service are not consistent across the transport sector which makes it very difficult to aggregate asset performance across the transport sector and make a case for investment.

2. NZTA should implement changes to the level of service model to consider cost, service, risk, and emissions for every decision for state highway maintenance, operations, renewal, and capital investment.

Emissions and risk should become more important considerations for investment planning and should take a consistent approach with local roads.

3. NZTA to improve demand models to forecast the impact of vehicle number and loading on the state highway network.

Vehicle loading has a direct impact on pavement condition, increased heavy vehicle traffic needs to be carefully forecast to align to investment profiles. The changes to models should inform better strategic planning of future investment.

4. NZTA state highway asset management teams to share services with local road managers to enable better consistency in road condition outcomes.

Alignment of state highways and local roads management practices will ensure some measure of consistency.

State highways reference documents

- Infrastructure Commission, Te Waihanga: Transport Sector State of Play Discussion Document, 2021
- *NZTA – Business case approach*
- [National pavement conditions dashboard](#)
- [Funding and transport – dashboard and open data.](#)

11. Transport: Rail

Rail transport sector overview

Rail has a long history in New Zealand, stretching back over 150 years. The network links most major cities, ports, and freight hubs, and connects the North and South Islands through the Cook Strait ferries. It also makes a significant contribution to the public transport systems in Auckland and Wellington. The rail sector is comprised of freight, long distance passenger services, suburban passenger services, and heritage rail services.

The infrastructure assets include the land owned by New Zealand Railways Corporation, the track owned by KiwiRail, and the facilities and other infrastructure owned by various other providers. KiwiRail also has significant engineering, stabling yards and facilities, and rolling stock.

Total system length is almost 4000 kilometres of track, 1000 km of which is electrified. Freight only track makes up about half of the system. There are 1500 level crossings, more than 1300 bridges and over 100 tunnels on the rail network. The Kaimai and Remutaka tunnels are approximately 9 km long each.

New Zealand's rail infrastructure is valued at over \$10 billion as of 2020.

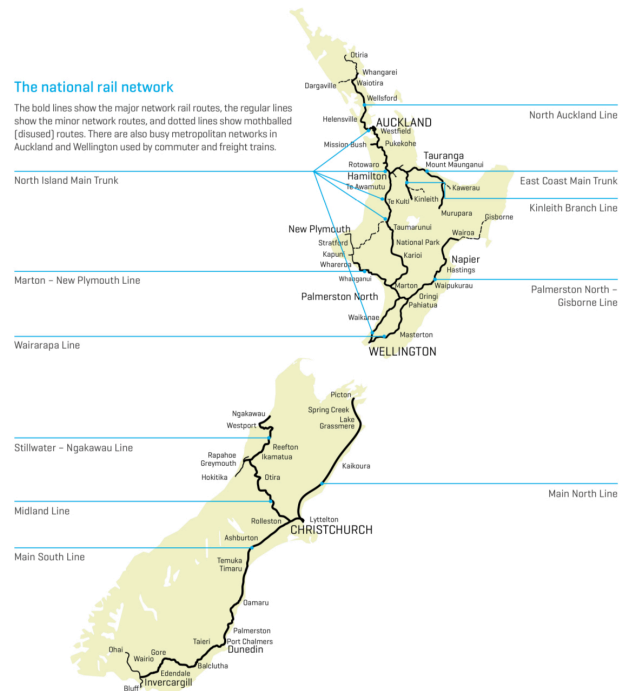


Figure 18: National rail network

Sector players

Central government

The Ministry of Transport determines the strategic priorities for the transport network through the GPS. The NZTA has primary regulatory responsibility for the oversight of rail safety, rail operator licensing and supports the rail network through funding.

New Zealand Railways Corporation owns the land beneath the KiwiRail network on behalf of the Crown. KiwiRail is a state-owned enterprise responsible for the rail network infrastructure and is the largest rail operator in New Zealand.

Great Journeys New Zealand is the tourism division of KiwiRail, and operates three scenic train services, the Transalpine, Northern Explorer and Coastal Pacific. Te Huia is a trial passenger service between Hamilton and Auckland capable of carrying over 500 passengers per day, and is subsidised by NZTA and operated by KiwiRail.

Local government

The other major operators are regional, being Auckland Transport (AT) and Metlink in Wellington. Auckland One Rail has been operating the Auckland suburban rail network since January 2022. Transdev is the operator of Wellington's Metlink Rail Network.

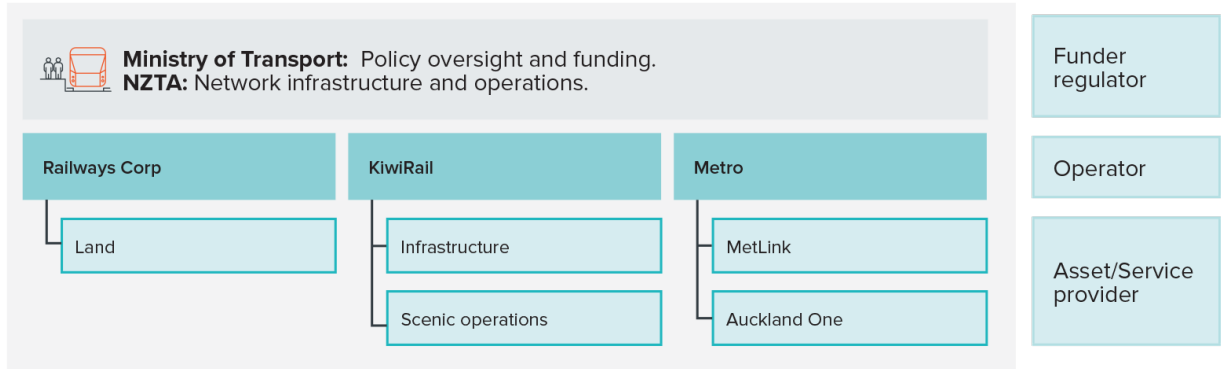
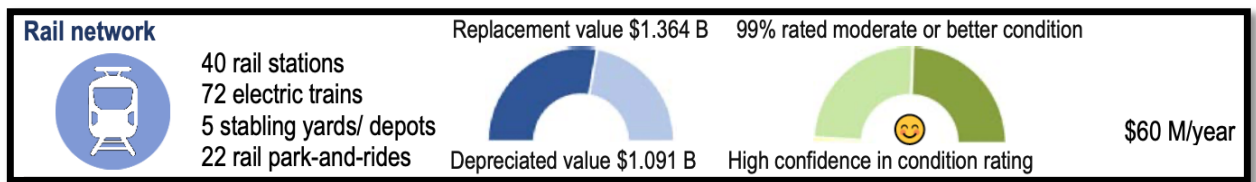


Figure 19: Sector players, Rail

Infrastructure asset performance

KiwiRail reports annual performance of their business, which includes asset performance for their asset classes.

AT describes its rail infrastructure as summarised below as being worth nearly \$1.4 billion, depreciating in value \$60 million per year and in moderate or good condition.



AT note in their 2021 Activity Management Plan that “track and signalling assets are KiwiRail’s responsibility, although their failure would affect AT’s services.”

Sector challenges

The sector faces major challenges in terms of:

- Resilience - as evidenced by the damage to the network from the Kaikoura earthquake, the rail network is vulnerable to seismic activity.
- Safety - Rail transport has a good safety track record with less than 30 deaths and serious injuries per year since 2014. There is a conflict point at level crossings which is where the largest number of train-striking-objects happens.
- Coordination of planned maintenance works with other transport providers to keep the network running smoothly.
- Securing sufficient funding to make improvements to the networks rather than just maintaining the current network.

Rail transport asset management drivers

Legislation and regulation

The Railways Act 2005 promotes the safety of rail operations and consolidates the legislation relating to railways and management of the railway corridor. Under the act, NZTA has primary regulatory responsibility for the oversight of rail safety, rail operator licensing and supports the rail network through funding.

The Land Transport (Rail) Legislation Act 2020 (the Rail Act) came into force on 1 July 2020. The Rail Act amends the LTMA and the Land Transport Act 1998, to implement a new long-term planning and funding system for the heavy rail track network owned by KiwiRail.

Rail transport asset management maturity

The New Zealand Rail Plan outlines the Government’s vision and investment priorities for rail, and the significant changes needed to strengthen rail in our transport system. The Rail Network Investment Programme (RNIP) sets out a three-year investment programme and a ten-year investment forecast for the national rail network – the thousands of kilometres of track and associated infrastructure such as signals, tunnels, and bridges, that provide the network for rail freight and passenger services in New Zealand. An overall summary of sector maturity is presented in Table 11.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	The strategic priorities and other directions from the Transport GPS are aligned to ensure the proposed activities give effect to the GPS. A statement of corporate intent is produced by KiwiRail every year which includes the strategic objectives of the sector.
Levels of service	Core	Lower end of core with most measures reported annually. Many metrics but not well linked with cost and risk.
Demand	Core	Demand forecasting is undertaken for passenger and freight but not well linked to investment in other transport activities.
Evidence	Core	Good evidence for most major investment decisions. Less so for maintenance and operations.
Risk	Core	Risk is a major consideration in the rail sector, and much is done at the interactions points with other transport modes and health and safety is a big focus.
Operational planning	Intermediate	The RNIP was first produced in 2021 by KiwiRail and included operations and maintenance investment.
Capital planning	Intermediate	Renewal forecasts for major investment categories have been planned for three years in detail and forward.
Financial forecasts	Intermediate	The RNIP has three-year and ten-year forecasts for investment.
Asset management plans	Core	KiwiRail has a core level AMP in place.
People	Core	KiwiRail has invested in asset management resources over the past few years, building a team of asset management professionals.
Service delivery	Core	Services are provided by a range of providers.
System and improvement	Core	KiwiRail has an asset management improvement programme.

Table 11: Asset management maturity, Rail transport

Rail transport funding

The NLTF provides some funding for the foundational network infrastructure, with other investments to improve services and grow the network capacity.

AT and Greater Wellington Regional Council are responsible for planning and funding their metropolitan rail services.

The Crown is jointly funding the City Rail Link with Auckland Council. It is New Zealand's largest public transport infrastructure project costing approximately \$5.5 billion.

Recommendations for rail transport

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: rail
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Responsibilities are distributed across several organisations. The system lead can ensure that there is consistency in asset management across these organisations.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The organisations in this sector have infrastructure at the core of their business have adequate governance for asset management in place.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand's economy, and it is important that the public given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Each of the organisations report on asset management performance measures, but the consistency of measures needs to be confirmed.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: AMPs are usually developed by organisations in this sector but are not always publicly available.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: rail
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: The GPS sets the priority for rail transport to follow, which includes increasing resilience.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Further recommendations for the rail sector are:

1. Consolidate performance of rail assets to a whole country view of asset performance and condition and investment requirements.

This would increase the transparency of where funding is required to create additional capacity and look after what we have already got.

2. Develop levels of service measures across the rail sector that are comparable to the road sector, with the actual performance and targets published in the AMP.

Rail transport delivers transport outcomes from the GPS alongside the state highway and local road network, so having comparable levels of service measures to the transport network would enable better investment choices across sectors.

Rail transport reference documents

- Infrastructure Commission, Te Waihanga: *Transport Sector State of Play Discussion Document, 2021*
- KiwiRail: [Rail Network Investment Programme, June 2021](#).

12. Transport: Air

Air transport sector overview

There are over 30 airports across New Zealand, which have regular passenger services and many more much smaller aerodromes and landing strips around the country, with 175 aerodromes (of all types) listed in the New Zealand Aeronautical Information Publication.

New Zealand's network of airports, across major urban centres and regional areas, form an integral part of the national economic infrastructure, and are critical to connecting communities and enhancing broader economic performance.

Airport authorities are granted certain powers and responsibilities for managing and operating airports in New Zealand. The main types of airport authorities are local and district councils, and airport companies such as Auckland International Airport.

New Zealand's largest airports have a mix of ownership structures:

- Auckland Airport is a publicly listed company and Auckland Council is a shareholder.
- The Waikato Regional Airport Ltd is a council-controlled organisation owned by Hamilton City, Otorohanga, Waipa, Waikato and Matamata-Piako District Councils and is made up of Hamilton Airport, Titanium Park Limited, Hamilton and Waikato Tourism and Jet Park Hotel Hamilton Airport.
- Wellington Airport is 66% privately-owned and 34% owned by Wellington City Council.
- Christchurch Airport is 75% owned by Christchurch City Council and 25% by the Crown.

Most of New Zealand's small and regional airports with scheduled services are owned by their local council.

- Five airports are in joint venture arrangements. These airports are half-owned by the Crown (Whanganui, Taupō, Whakatāne, Westport, and Whangarei).
- One airport – Milford Sound Airport – is fully government-owned and operated.
- There are a few privately-owned airports (West Auckland, Paraparaumu) and one is owned by a community trust (Chatham Islands).

Airport infrastructure was valued at over \$10 billion in 2020.

New Zealand's airports are assessed to generate added value of \$419 million per year and account for 5,440 jobs. A further \$6.5 billion per year and 80,000 jobs are involved directly in aviation-related activities in the airport environs (Airport Master Planning Guide 2017).



Figure 20: Airport locations

Sector players

This report focuses on the airports' critical infrastructure, although we acknowledge the importance of other sector players. The Ministry of Transport sets the policy and strategy for the air transport sector.

The **Civil Aviation Authority of New Zealand (CAA)** establishes and maintains the rules that all pilots, engineers, aircraft operators, airlines, and aerodromes, follow to keep flying safe, and checks that these rules are being complied with and takes action if they find that they are not. It also monitors the aviation safety performance of each size of aircraft, produces several safety publications and runs safety training courses and seminars.

Airways is New Zealand's air navigation service provider, responsible for air traffic control and the infrastructure to keep New Zealand's skies safe.

The **New Zealand Airports Association (NZ Airports)** is the national industry voice for airports in New Zealand. It is a not-for-profit organisation whose members operate 37 airports that span the country, and enable the essential air transport links between each region of New Zealand, and between New Zealand and the world.

Auckland Airport is the largest and busiest airport and is one of our most important infrastructure assets.

Air New Zealand along with **Jetstar**, **Sounds Air**, and **Origin Air**, operate most of the fleet of air transportation assets across the country with private sector operators.

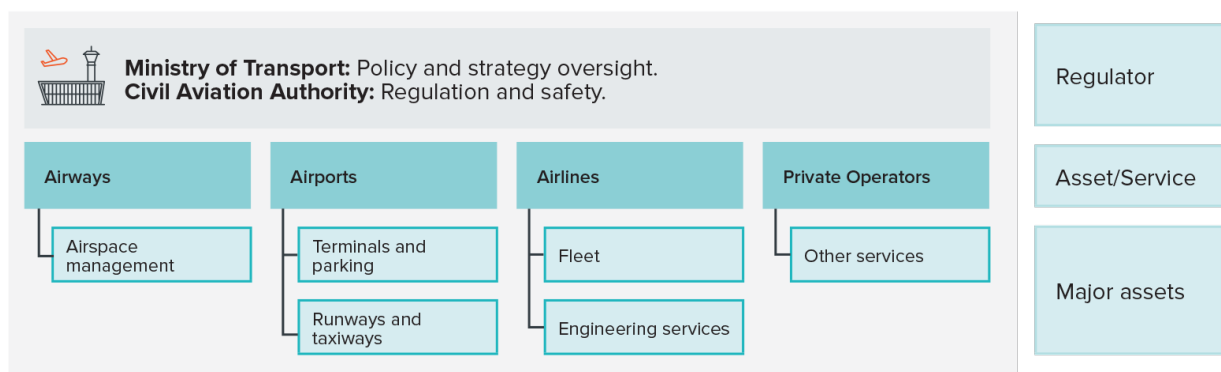


Figure 21: Sector players, Air

Infrastructure asset performance

Asset information is not aggregated for airport infrastructure nationally, so forming a picture of asset performance is not simple. Levels of service are understood reasonably well in terms of customer waiting time, customer satisfaction and availability of space for airlines. Capacity is the biggest driver of capital investment upgrades.

Sector challenges

Managing airports involves oversight of many different asset groups such as roads, water supply, wastewater, stormwater, property, along with airport specific assets such as runways, and fire and emergency support assets.

COVID-19 was the biggest challenge the air transport sector has ever seen. Investment in infrastructure is capital focussed and was impacted through the severe reduction in passenger numbers during the COVID period. Continual investment in, and upgrading of, the aviation infrastructure at airports is needed to drive national productivity and economic performance.

Air transport asset management drivers

Legislation and regulation

The Civil Aviation Act 1990 governs New Zealand’s civil aviation system, and sets the overall framework for aviation safety, security, and economic regulation. The Airport Authorities Act 1966 gives airport authorities a range of functions and powers to establish and operate airports. The Commerce Act 1986 provides for the economic regulation of airports, under which the Commerce Commission sets information disclosure requirements for the three main international airports.

Industry guidance

New Zealand’s air transport policy came into effect in 1985, and aimed to ensure the economy benefitted from international air services. The policy was updated in 1998, then reviewed, consulted on, and updated again in 2012.

The New Zealand Government has adopted the National Airspace and Air Navigation Plan, to set a pathway to modernise all aspects of the aviation system. It is a guidance document that provides clear direction on the safe, cohesive, efficient, and collaborative management of New Zealand’s airspace and air navigation system over the next decade. It is being given effect by the New Southern Sky programme led by the Civil Aviation Authority of New Zealand. New Zealand Airports produces industry guidance called the “Airport Master Planning Good Practice Guide”.

Air transport asset management maturity

Asset management maturity varies widely across airports within the air transport sector. Airports sit at a low level relative to the importance of the infrastructure from a risk and economic perspective. An overall summary of sector maturity is presented in Table 12.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	The strategic asset management objectives for airports are well aligned with business objectives. Alignment to community outcomes for those assets owned by councils is not so clear.
Levels of service	Core	Operational levels of service are quite well understood and aligned to customer requirements. Asset condition levels of service are not so well aligned.
Demand	Intermediate	Demand modelling is undertaken to forecast passenger and airline numbers, and the impact on airport asset capacity needs.
Evidence	Core	Good evidence is in place for some performance metrics, but not for all level of service forecasts.
Risk	Intermediate	Risk is well understood for operational activities, but is not embedded in decision-making.
Operational planning	Intermediate	Airport operations generally run smoothly, with high-risk activities prioritised.
Capital planning	Intermediate	Renewal planning is simplistic but does use condition and age information. Little complex deterioration modelling is done for asset condition.
Financial forecasts	Core	Financial modelling is undertaken for the short-term planning process.
Asset management plans	Core	AMPs have been produced for most of the large organisations, especially those with local government ownership.
People	Core	Securing effective skills and competencies is a challenge at the moment.
Service delivery	Core	Services are provided by a range of in-house or out-sourced private sector maintenance. Most capital is outsourced.
System and improvement	Core	Plans that detail the specific improvements tasks to deliver, are developed for most airports

Table 12: Asset management maturity, Air

Air transport funding

The largest airports in the country have private ownership and the ability to raise capital through private mechanisms. Funding for other airport infrastructure is predominantly through the local government LTP process. The New Southern Sky is a ten-year programme to implement the National Airspace and Air Navigation Plan and modernise New Zealand’s aviation system.

The National Airspace Policy was developed by the Ministry of Transport, the Civil Aviation Authority, and the National Airspace and Air Navigation Advisory Forum. The policy sets out principles for the classification and design of airspace, the funding of air traffic management and air navigation services, and the resilience of the airspace system.

Recommendations for air transport

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: Air
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Although the Ministry of Transport and the Civil Aviation Authority have oversight roles, they do not include asset management responsibilities.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The organisations in this sector have infrastructure at the core of their business and have adequate governance for asset management in place.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand’s economy, and it is important that the public are given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There is little consistency in reporting of asset performance measures in this sector.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Although most of the organisations in this sector develop AMPs, they are not necessarily publicly disclosed.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: Air
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: This is important to ensure that short-term commercial considerations do not override the priority of longer-term infrastructure resilience in this sector.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Specific sector recommendations for air transport are:

1. Require disclosure of AMPs for critical airport infrastructure facilities and assets including LTPs for future asset renewal and transparency on deferred maintenance.

Airport infrastructure is critical for New Zealand's economy and safety, however there is little visibility of asset performance or plans. Making AMPs readily available to the public would help provide that visibility.

This report does not make specific recommendations for the airlines, airways, or private operators.

Air transport reference documents

- Infrastructure Commission, Te Waihanga: *Transport Sector State of Play Discussion Document, 2021*
- NZ Airports Association [Airport Master Planning Good Practice Guide](#).

13. Transport: Sea

Sea transport sector overview

New Zealand's coastal shipping sector fulfils a critical role in New Zealand's freight system. It provides a safe and sustainable mode for transporting large, heavy cargo such as petroleum products, cement, and aggregate. New Zealand is a small country with twelve major ports. Sea ports play a vital role for international freight connections and tourism. There is a wide range of port size, scale, and infrastructure.

The port companies are of different size and scale. The two largest port companies are Port of Tauranga and Ports of Auckland. Based on their results for 2019/20, these two companies own 51% of all of the assets (by value) that are owned by port companies in New Zealand and generate 38% of the revenue.

Tauranga is New Zealand's largest export port (48% of total exports by value in 2020 went through that port). Auckland is the largest import port (receiving 51% of total imports by value). By comparison, the five smallest port companies own 11% of assets, generate 13% of revenue, and process less than 15% of the exports and imports that go through New Zealand ports.

Total port infrastructure is approximately valued at \$6.5 billion in total as of 2020.

Sector players

The **Ministry of Transport** has oversight of the maritime transport sector.

The **Port Industry Association** represents companies involved in all port activities throughout New Zealand.

There are 12 **port companies** incorporated under the Port Companies Act 1988 which are defined as public entities.

Ownership of the port companies is complex, but all are majority or wholly owned by councils, with some listed on the NZX stock exchange.

Most coastal centres will have some sea infrastructure such as wharves, generally owned by the local council or community organisation.

NZTA has some co-investments with other sector players in coastal shipping.

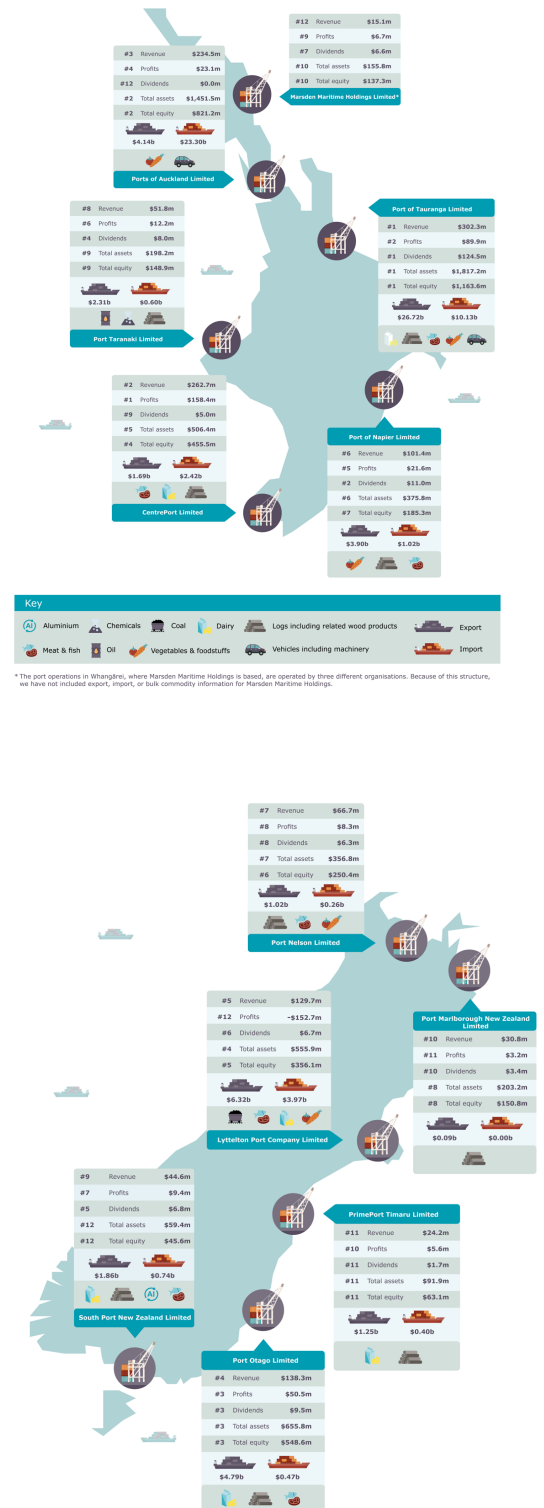


Figure 22: Port locations

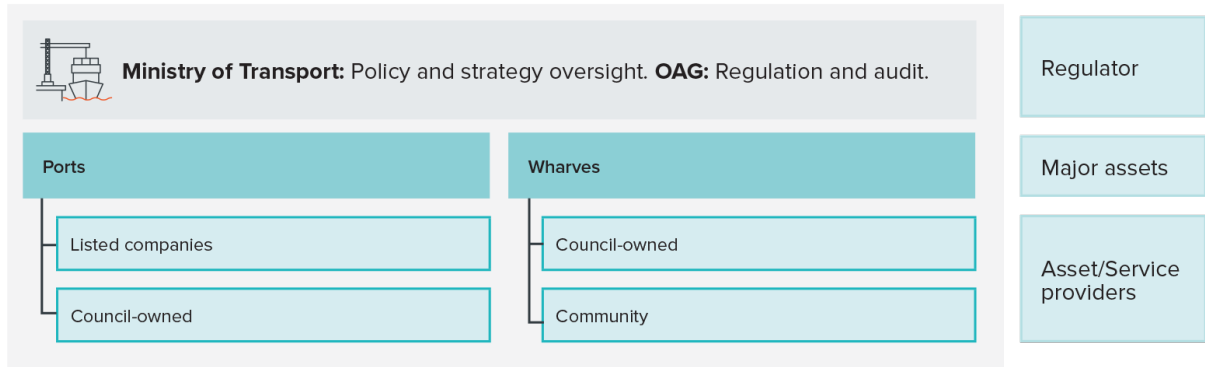


Figure 23: Sector players, Sea transport

Infrastructure asset performance

Port asset performance information is not publicly available.

Sector challenges

Ports are public assets and are majority owned by councils or community interests. There is a risk that, without a level of coordination, the collective investment of the port sector will not be optimised with other transport alternatives.

Specific sector challenges include:

- ability to respond to international trends in freight and logistics,
- ageing infrastructure,
- sustainability and RMA challenges in coastal areas,
- pressure on the best use of land occupied by ports close to urban centres such as Auckland, and
- decarbonisation.

Sea transport asset management drivers

Legislation and regulation

The Port Companies Act 1988 provides for the formation of port companies to carry out port related commercial activities. The port companies as public entities are audited by the Auditor-General, however there is no requirement under the Act to provide publicly available asset management performance or plans, other than the Statement of Corporate Intent.

Industry guidance

The Port industry Association leads on many of the aspects of port management but does not mention asset management specifically.

Sea transport asset management maturity

Port asset management maturity is generally at a low level, however there are no known asset management maturity assessments available in this sector, and the assessment is based on anecdotal

The private sector's capacity to deliver the required level of development and help address New Zealand's infrastructure deficit is under-utilised and provides a big opportunity to help overcome current challenges.

Our listed port companies are a good example of successful public-private partnerships.

Napier Port used the capital raised from its share market listing to deliver a new wharf, Te Whiti, which was constructed for \$171 million, coming in below the original budget of \$173 million to \$190 million and ahead of schedule. (NZ Herald, 7 June 2023)

evidence. The Auditor-General has some concerns about over investment in the port sector given the lack of coordination and business case development. An overall summary of sector maturity is presented in Table 13.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	The Port Companies Act states that the principal objective is to operate as a successful business, but this is subject to shareholder definition.
Levels of service	Basic	Levels of service are not consistent across the sector, but many metrics are monitored.
Demand	Core	Demand for port activity is well managed and forecast, however with little disclosed information there is little evidence of a link to asset capacity.
Evidence	Core	Good evidence is in place for some performance metrics, but not for all level of service forecasts.
Risk	Core	Risk is well understood for operational aspects.
Operational planning	Core	Maintenance and operations are well considered to keep the port operations moving.
Capital planning	Core	Renewal and capital planning is mixed across the port companies with evidence of some planned renewals.
Financial forecasts	Basic	The OAG undertakes financial audits of the port companies and has found concerns about the variability in how individual port companies report their returns.
Asset management plans	Basic	No AMPs have been reviewed as part of this report.
People	Core	Less evidence of investment in asset management resources.
Service delivery	Basic	Port companies generally have a mix of internal and external service providers to support the continued operations.
System and improvement	Basic	There is some evidence of improvement planning and systematic asset management development.

Table 13: Asset management maturity, Sea transport

Sea transport funding

In the last five years, port companies have invested about \$2 billion in their assets, funded from owners and revenues. One of the main reasons that all port companies have invested in their assets is because the ships visiting New Zealand's ports are getting larger.

The GPS 2021 introduced coastal shipping as a new activity class. Through the NLTP, the NZTA Board have allocated \$30 million for co-investment in the coastal shipping activity class.

Recommendations for sea transport

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: sea
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: Although the Ministry of Transport has an oversight role, it does not include asset management responsibilities as proposed in this recommendation.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for	Medium relevance: The organisations in this sector have infrastructure at the core of their business and have adequate

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to transport: sea
	asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	governance for asset management in place.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand's economy, and it is important that the public are given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There is little consistency in reporting of asset performance measures in this sector.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Although most of the organisations in this sector develop AMPs, they are not necessarily publicly disclosed.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: This is important to ensure that short-term commercial considerations do not override the priority of longer-term infrastructure resilience in this sector.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Specific recommendations for ports are:

1. Implement the 2023 New Zealand Freight and Supply Chain Strategy released by the Ministry of Transport.

The strategy informs investment decisions by central and local government and the private sector.

Sea transport reference documents

- Infrastructure Commission, Te Waihanga: *Transport Sector State of Play Discussion Document, 2021.*
- Office of the Auditor-General: *Results of our 2019/20 audits of port companies, 2021.*

14. Health: Public sector

This report reflects the structures of the sector as at the end of 2023. Subsequent structural changes, such as the disestablishment of the Māori Health Authority, are not reflected. The structural changes had not had a material impact on asset management maturity ratings at the point of time of this report.

Public health sector overview

The public health sector covers all publicly owned or managed health facilities, including hospitals and mental health facilities. The physical infrastructure underpinning the health system includes community-based facilities, aged residential care facilities, hospitals, and privately funded health care facilities.¹¹ Private hospitals, primary health and retirement villages are included in the next section “Health: Private sector”.

Significant health reforms took effect from 1 July 2022. Health New Zealand (HNZ) manages all health services, including hospital and specialist services, and primary and community care. Ownership of the previous District Health Boards’ (DHBs) assets have been transferred to HNZ, which provides the opportunity for greater consistency and national leadership of the management of the public health infrastructure assets.

Health facilities consist of buildings and significant services infrastructure, such as electrical services, water, heating, and reticulated medical gases. There is non-clinical infrastructure such as administrative and supporting facilities such as laundries, kitchens, boilers, and tunnels which may or may not be on hospital sites. There are 1,272 buildings in the HNZ portfolio¹². Infrastructure related to primary health services is mostly delivered by the private sector and these facilities are not covered in this section. Treasury identified public health assets are valued at \$12 billion in 2020/21¹³ and the National Asset Management Programme (NAMP) current state assessment identified the replacement cost (in 2020) as \$24 billion and \$14 billion of investment intentions (from 2018 estimates)¹⁴.

¹¹ Health and Disability System Review, Health and Disability System Review Final Report, 97-8, 147.

¹² Provided by HNZ as part of consultation

¹³ [He Puna Hao Pātiki: 2022 Investment Statement \(treasury.govt.nz\)](https://www.treasury.govt.nz/publications/2022-investment-statement), page 21

¹⁴ <https://www.health.govt.nz/publication/national-asset-management-programme-district-health-boards-report-1-current-state-assessment>, page 6

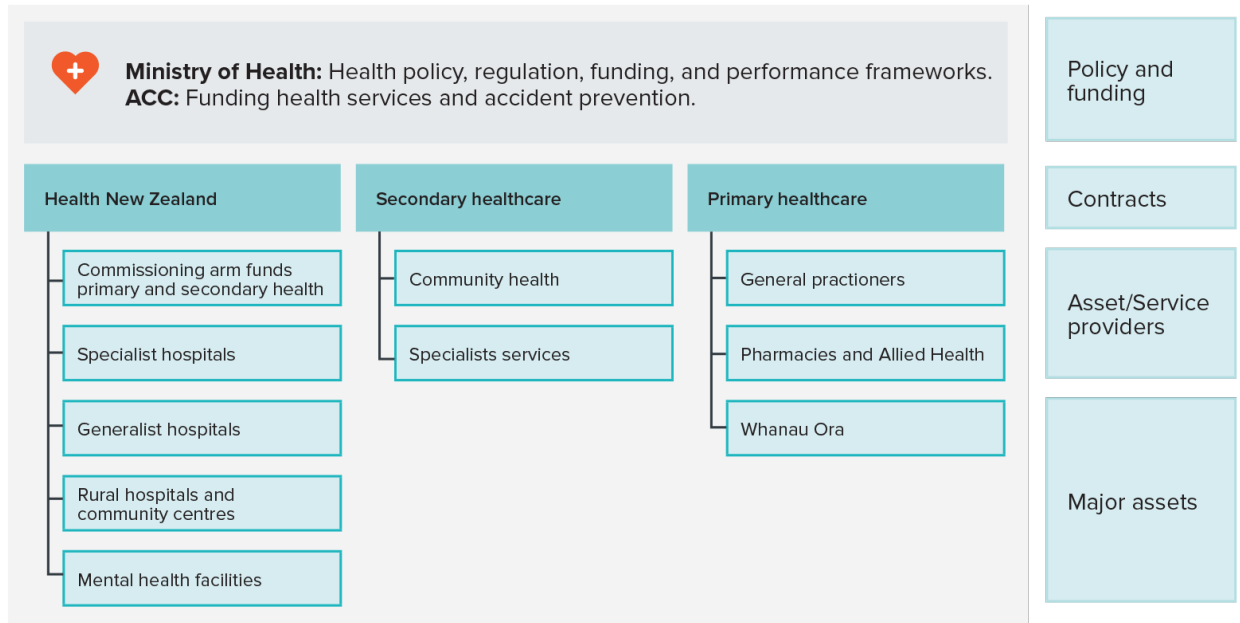


Figure 24: Sector players, Public health

Sector players

Public health facilities are owned and managed by the Infrastructure and Investment Group within **HNZ**. The **Ministry of Health (MoH)** sets direction and policy for the health system, advises the Government on funding and system settings, regulates the health system, and monitors health outcomes.

Infrastructure asset performance prior to Health New Zealand establishment

DHBs were to report on asset performance indicators in annual reports, and larger DHBs did (see example below), but smaller DHBs, not having Treasury scrutiny through the ICR, did not. There was no consolidated financial reporting and service target reporting, and often no asset levels of service to translate the service targets to asset requirements. The NAMP report identified that while building envelopes of hospitals are mostly in good to average condition, sitewide infrastructure was in poorer condition and mostly older buildings were not fit-for-purpose¹⁵.

¹⁵ [The National Asset Management Programme for district health boards Report 1](#), page 11

Asset Performance Measures are provided below, including comparatives.

Measure	Indicator	2020/21 Target	2020/21 Actual	2019/20 Target	2019/20 Actual
Building floor space utilised versus total floor space available % of floor space utilised in buildings on all campuses versus total space available in buildings on all campuses (space is identified in Asset Revaluation reports)	Utilisation	85%	98%	85%	97%
Building condition grading measured by floor space % of campus floor space graded as Average to Very Good to total campus floor space. Condition Grading levels are: Very Poor, Poor, Average, Good and Very Good; refer to comments in opening paragraph	Condition	85%	67%	85%	67%
Building condition grading measured by meeting building compliance requirements % of Buildings used with valid Building Warrant of Fitness (BWF) to total buildings in the portfolio. BWF is a compliance requirement	Condition	100%	100%	100%	100%
Seismic compliance % of floor space assessed as being earthquake prone (i.e. 33% or less of New Building Strength (NBS))	Condition	0%	1%	0%	1%
Building Functionality grading measured by floor space % of buildings (by floor space) graded as Moderate to Full functionality. Functionality Grading levels are: Unfit, Partial, Moderate, Good and Full	Functionality	65%	68%	65%	68%

Figure 25: Auckland DHB asset performance measures for property 2021/21 annual report, page 54

Sector challenges

The health reforms should improve the focus on infrastructure asset management, including better coordination and consistent standards over time. DHB leadership has historically been more focussed on service performance and operational deficits as that was the focus of the funding, accountability, and performance model. This has led to under-investment in assets and health facilities that have not kept pace with population growth and demographic changes, such as an ageing and more diverse population, as well as changing models of care and technological advancements. The recent pandemic may have increased public expectations of health services and has increased media scrutiny of health services including health infrastructure.

The NAMP report identified the following factors affecting the quality of public health infrastructure:

- health sector weakness in asset management,
- the prioritisation of expenditure on operational rather than capital requirements, which has led to a significant backlog of deferred maintenance,
- the demands of rapidly changing health technologies, and
- the inability of DHBs to adapt quickly enough to changing demands.

The COVID-19 pandemic highlighted inconsistencies in health facilities in the previous DHB model such as differences in the provision of Intensive Care Unit (ICU) beds relative to population.

Recent actions to enhance understanding of the health asset portfolio

Since the NAMP report, there has been several activities commenced to improve the understanding and management of the state of public health infrastructure.

A seismic programme is underway to put in place a seismic policy and risk management strategy, build a national view of seismic status of health facilities, develop an approach for the prioritisation of

mitigation work, and develop technical guidance for new and existing buildings. It also includes putting in place procedures and arrangements for post-earthquake response.

HNZ is developing a condition assessment methodology and associated procedures to produce consistent asset condition information, suitable for informing the prioritisation of investment on building and infrastructure assets. A risk and assurance assessment has also been undertaken on the status of utilities (horizontal infrastructure) for hospital sites, that provides a foundation for mitigation of risks around potential service failure and the strengthening of the resilience of hospital sites.

A climate risk assessment was undertaken to generate understanding of climate risks to existing assets, to allow HNZ the ability to manage and adapt to these risks. These risks arise from a range of climate-related hazards which include increases in sea level, increases in temperature and incidence of droughts, as well increases in the frequency, intensity, and duration of extreme weather events (for example, floods and storms).

Public health asset management drivers

Legislation and regulation

Asset management requirements were identified under the Cabinet Office Circular CO(19)6 Investment Management and Asset Performance in the State Services, but as stated in sector settings section, there were no compliance checks by Treasury or Audit. The updated Cabinet Office Circular CO(23)9 requires Chief Executives to attest that the circular requirements are met. Health is also subject to a range of legislation and regulation, including building compliance under the Building Act 2004 and associated regulations. The Office of the Auditor-General focussed on health sector asset management, releasing several reports from 2015 to 2020, and making it an area of focus for DHB audits.

Industry guidance

Previously, MoH provided some guidance for DHBs, but this will now be directly provided by HNZ. There are also industry approaches such as the Australasian Health Facility Guidelines that are used to inform the design of health facilities in New Zealand.

Public health asset management maturity

The Ministry of Health published the NAMP report in 2020. This included a high-level assessment of the asset management maturity of 11 DHBs. Seven DHBs and the Ministry of Health have been assessed through two rounds of the ICR, which includes scoring of their asset management maturity and asset performance. The analysis in the NAMP report identified asset levels of service and asset data elements with the lowest maturity. The asset management maturity results in the ICR identified that some DHBs had good asset management in place, but some had less mature approaches, with one DHB receiving the lowest grade “D” out of the whole central government sector.

A second report in the series ‘a national asset management plan for the health sector’ was to be delivered in 2022 with scope dependant on resources. This has not yet been published despite specific investment as a Budget 2020 initiative, and re-prioritisation was subsequently agreed by Joint Ministers. Over the transition period, HNZ is building capability and capacity, and is developing an Infrastructure Investment Plan and National Asset Management Strategy by December 2023.¹⁶

The asset management maturity ratings in Table 14 are lower than the previous AMMA undertaken for DHBs in the ICR process. The assessment methodology now requires “embedded practice” for “basic”

¹⁶ [Interim Government Policy Statement on Health 2022-2024 | Ministry of Health NZ](#), page 27

and above scoring, and we haven't taken into consideration any change in maturity resulting from the health sector reforms. For this reason, the ratings below have a low level of confidence. An overall summary of sector maturity is presented in Table 14.

Asset management function	Maturity	Overview of current practice
Strategic direction	Aware	HNZ was established in 2022 and is operating under an Interim Government Policy Statement on Health 2022-2024 that identifies outcomes and objectives. A National Asset Management Strategy and Infrastructure Investment Plan is due to be delivered by December 2023.
Levels of service	Aware	There are performance frameworks and mandatory reporting at a "service" level for Hospitals, but these do not include any infrastructure metrics. There are currently no published asset levels of service for the health sector available.
Demand	Aware	Demand forecasting was previously completed at DHB level although Auckland DHB collaborated on a Northern Regional Long-Term Plan. The current media reports of health workforce shortages would indicate there are limited national demand models and forecasts for public healthcare.
Evidence	Basic	There are quarterly performance reporting metrics but there are no infrastructure metrics in place but some reporting in previous DHB annual reports. The current state assessment did identify the condition and functionality of hospitals, mental health facilities, clinical equipment, and ICT in 2019. The health sector reform will require consolidation of DHB assets and asset registers which is likely to take some time and may lead to issues around asset data as inconsistent asset data structures and systems will make consolidation difficult and time-consuming.
Risk	Basic	Work is underway on a risk and assurance assessment of horizontal infrastructure at hospitals, a seismic work programme being developed, and climate change risk assessment. Risks may be considered at project level.
Operational planning	Aware	Maintenance and operational planning were previously undertaken at a DHB level.
Capital planning	Aware	An Infrastructure Investment Plan is not in place (due December 2023). There have been widely reported delays in project delivery in the health sector. There has been historic under-investment in health infrastructure assets.
Financial forecasts	Aware	The current state assessment provided an overall assessment of assets but did not include any financial forecasts. There are no publicly available financial forecasts for infrastructure investment and no investment plan currently in place.
Asset management plans	Basic	Some DHBs had completed AMPs to varying levels of completeness and maturity. There is no current AMP covering the health sector although building blocks towards this are being developed.
People	Aware	There is limited asset management capability and capacity in the health sector except for clinical equipment engineering. The implementation of health reform has anecdotally increased staff turnover in facilities, asset, and investment management at hospitals, but capability and capacity may be building at HNZ, and it is a priority.
Service delivery	Basic	Most hospitals had either in-house or out-sourced maintenance but limited strategic contracts.
System and improvement	Aware	No evidence of asset management systems and improvement activities.

Table 14: Asset management maturity, Public health

Public health funding

Public healthcare is mostly Crown-funded either directly through health funding or via Accident Compensation Corporation levies. Most primary and secondary health services receive public funding

(often with co-share payments by service users) but are in privately owned infrastructure and are covered in the private health sector. Up until 2020, DHBs had a differentiated funding model where depreciation and capital charges were not adjusted for valuation and DHBs could raise debt. Depreciation funding (funded in cash for capital renewal) was not ring-fenced, and this meant that it could be re-prioritised for operational and staff costs. The lack of ring fencing and low levels of depreciation funding from undervalued buildings, has contributed to historic under-investment in assets, that will need to be addressed to support New Zealand’s health needs. The valuations have already increased from approximately \$6 billion in 2019, to a more realistic figure of \$12 billion in 2020/21 (also reported in the 2023 annual report¹⁷), without significant capital investment in health¹⁸.

It has been recognised that capital planning needs to be developed from a system-wide perspective to ensure investments in facilities, equipment, ICT, and new workforces are complementary, aligned with new models of care and future service requirements. A critical component of the planning process would include a prioritised pipeline of major health sector projects. MoH estimates investment of more than \$14 billion (excluding repairs and maintenance) will be required over the next decade. This level of investment is due to the age and condition of the current estate, combined with the demands generated by a growing and ageing population.¹⁹

Recommendations for public health sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to health: public
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There is no central government system lead for asset management.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There are new organisational structures through health reform including a Chief Infrastructure Officer but given the size and complexity of health assets these needs to be supported through governance and leads at each hospital.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Since the ICR has been disestablished there is no assessment of asset management maturity and no transparency on practice.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The consistent set should be complemented by specific health asset performance measures.

¹⁷ [Te-Whatu-Ora-HNZ-Purongo-a-tau-Annual-Report-22-23 \(1\).pdf](#), page 266

¹⁸ [He Puna Hao Pātiki: 2022 Investment Statement \(treasury.govt.nz\)](#), page 21

¹⁹ The New Zealand Health and Disability Review, Health and Disability System Review: Interim Report, 230.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to health: public
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The NAMP provided a current state in 2020, but it is not clear if AMPs are now in place.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Resilience levels across critical health infrastructure should be identified along with targets with investment plans.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Specific recommendations related to public health are:

1. Ensure there is appropriate scrutiny of asset management and infrastructure performance across the health sector to ensure that improvements are made.

The current health reforms provide the opportunity for greater understanding and visibility of the state of health facilities, to ensure it is safe, resilient, future-proof, and fit-for-purpose.

2. Consider "ring-fencing" depreciation (for asset renewal) and asset maintenance funding to ensure that funding is not re-prioritised into health services, including quantifying any deferred maintenance and/or compliance requirements (such as passive fire requirements).

Incentives have been strong to improve service performance in Health but weak to ensure sustainable infrastructure is in place for better health services overall. The recent CO(23)9 circular provides more guidance on depreciation including paragraph 31 that depreciation must be applied to assets.

3. Establish demand and "models of care" for health across New Zealand aligned to assets levels of service, enabled by infrastructure investment so that health facilities are fit-for-purpose and are delivered in time for demographic changes.

There are options to deliver health more efficiently, such as more preventative or primary care, but previously the health sector has failed to implement model of care changes. There is no overall long-term forecast of demand for health services, and the previous regional structure for DHBs has meant there has not been a consistent national service model projecting key measures such as ICU beds per head of population.

4. Ensure there is an appropriate capital investment model and funding for health infrastructure at a wider programme level with a clear long-term investment pipeline.

Past prioritisation has tended to be location-specific, such as the replacement of Dunedin Hospital, and there hasn't been appropriate prioritisation nationally or funding certainty in place to help identify the likely remaining life of assets. This should occur over a 5-to-20-year time horizon, including comprehensive hospital site master-planning (to identify the current and future locations of buildings and horizontal infrastructure).

5. The planning and delivery process also needs to be efficient and effective, with some modular standardisation considered.

Some standardised design would simplify ongoing maintenance and renewal, as well as provide better useability for staff that frequently work across multiple locations.

Public health reference documents

- Ministry of Health: [The National Asset Management Programme for district health boards: Report 1: The current-state assessment](#)
- Infrastructure Commission, Te Waihangā: [Sector state of play: Health](#)
- Ministry of Health: [Health and disability system review](#)
- Ministry of Health: [Interim Government Policy Statement on Health 2022-2024 | Ministry of Health NZ](#)
- Te Whatu Ora: [Te Pae Tata Interim New Zealand Health Plan 2022](#)
- DHB and Ministry of Health Annual reports
- CO(23)9 Cabinet Office Circular
- Office of the Auditor-General: [District health boards' response to asset management requirements since 2009](#)
- Office of the Auditor-General Health sector – results of audits (various reports)
- Te Whatu Ora: [Te Whatu Ora - Health New Zealand - Annual Report 2022-2023](#).

15. Health: Private sector

Private health sector overview

Private health facilities in New Zealand are mostly operated and owned by private healthcare providers, including private hospitals, clinics, and specialist medical centres. These private healthcare providers operate independently of the publicly funded healthcare system, and offer a range of medical services to patients who choose to use private healthcare options. Some of the prominent private healthcare providers in New Zealand include:

- **Private hospitals:** There are several private hospitals in New Zealand that offer a wide range of medical services, including surgeries, diagnostics, and specialised treatments. These hospitals are privately-owned and operated, and patients can access their services by either paying out-of-pocket or through private health insurance.
- **Specialist medical centres:** Private specialist medical centres focus on specific areas of healthcare, such as orthopaedics, cardiology, fertility treatments, and cosmetic procedures. These centres provide specialised consultations, diagnostics, treatments, and surgeries to patients seeking specialised care.
- **Clinics and day-surgeries:** Private clinics and day-surgeries provide outpatient medical services and minor surgeries. These facilities offer consultations, diagnostics, and minor procedures that can be performed on the same day, allowing patients to return home without an overnight hospital stay.
- **Imaging and diagnostic centres:** Private imaging and diagnostic centres offer a range of diagnostic services, including X-rays, ultrasounds, MRI scans, CT scans, and laboratory testing. These centres provide timely access to diagnostic services and can be utilised by both private and public healthcare providers.
- **Retirement villages:** As of 2021, there were over 650 registered retirement villages in New Zealand. The retirement village industry in New Zealand has been growing steadily in response to the increasing demand for retirement living options and aged care services.

Sector players

MoH is responsible for the overall regulation and oversight of the healthcare system in New Zealand, including private health facilities. The MoH establishes national standards, policies, and guidelines to ensure the quality and safety of healthcare services, including those provided by private facilities. They monitor compliance with regulations and may conduct audits and inspections to assess the quality of care provided.

The **New Zealand Retirement Village Association** is a national industry association representing the retirement village sector in New Zealand. **MBIE** is responsible for administering and enforcing the Retirement Villages Act 2003, which sets out the legal framework for retirement villages in New Zealand. MBIE oversees the registration and certification of retirement villages, monitors compliance with legislative requirements, and investigates complaints or disputes related to retirement village operations.

Figure 26 below identifies examples in the private health sector, noting this is not intended as an exhaustive list.

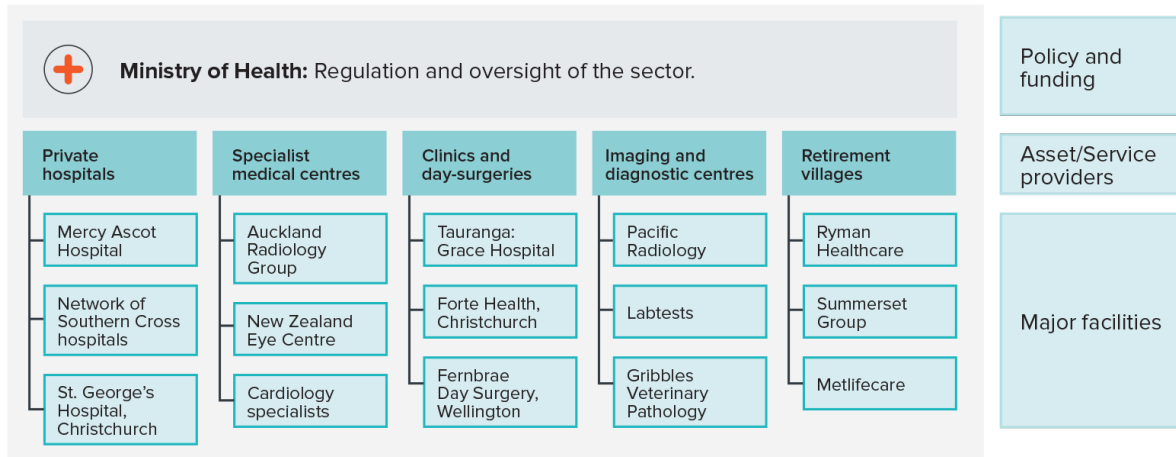


Figure 26: Sector players, Private health

Note that this diagram only includes some examples of the many providers.

Infrastructure asset performance

The retirement village sector has been in a growth phase in New Zealand in recent years, and this is expected to grow further as our population grows and ages. The sector has generally responded well to growth with a focus on providing additional capacity and meeting retirees' accommodation needs., but there is concern that insufficient funding is being provided for elderly care. There have also been issues with staffing shortages across the care sector. Issues in the media about cases of sub-standard care have generally been staff-related, rather than issues with facilities.

Sector challenges

There do not appear to be any systemic issues that prevent good asset management in the sector, however the commercial focus of many retirement village organisations does not guarantee sufficient focus on long-term asset planning. The Retirement Village Residents Association has been formed to promote and protect the rights of retirement village residents, and they are seeking reviews of the Retirement Villages Act 2003 and Code of Practice 2008.

Private health asset management drivers

Legislation and regulation

The specific regulatory framework for private health facilities is outlined in the Health and Disability Services (Safety) Act 2001 and its associated regulations. MoH conducts regular inspections and audits of private health facilities to ensure compliance with the prescribed standards and regulations. These inspections assess various aspects of facility operations, such as patient safety, infection control practices, equipment maintenance, staffing, and documentation.

Disclosure requirements around asset management in the retirement village sector are very limited and do not impact on the level of maturity of practices. The key requirements of a disclosure statement are described in Schedule 2 of Retirement Villages Act 2003. The Act does not encourage anything more than a brief statement on the overall condition of the assets and any major planned development, as well as the provision made for maintenance and refurbishment at the retirement village.

There is no requirement to assess asset management maturity in the sector. The retirement village sector in Australia has recently been required to publish AMPs, but these have largely taken the form of capital budgets.

Legislation may be needed to require disclosure of evidence of AMPs.

Industry guidance

The sector has had little interaction with asset management industry bodies and there is no specific guidance other than the disclosure requirement for retirement villages listed above.

Private health asset management maturity

At this stage, little is known about the asset management maturity of other health providers outside of the hospital sector. The anecdotal evidence we have seen, indicates that asset management is relatively immature and is undertaken at an operational level. Most of the facilities in this sector are owned and operated by large commercial or charitable organisations.

One of the retirement village organisations in New Zealand has recently developed a complete set of AMPs, but others are mainly reactive when looking after current assets and commercial in development of new village capacity. There has been little change in asset management maturity over time in this sector. An overall summary of sector maturity is presented in Table 15.

Asset management function	Maturity	Overview of current practice
Strategic direction	Basic	Organisations in this sector are predominantly privately-owned and commercially driven. Strategies tend to focus on growth drivers and providing the level of care that customers require. Although there are disclosure requirements, they are very light on asset management.
Levels of service	Aware	There are very few levels of service measures for assets in this sector. Resident customer satisfaction surveys are undertaken by major providers, and sometimes these incorporate some property related questions.
Demand	Core	The industry has been experiencing rapid growth and has demonstrated a high degree of capability to meet increased capacity requirements. There is no common methodology for forecasting demand within the sector, but this does not appear to be an issue.
Evidence	Basic	Asset data quality is variable in this sector, with little focus on data collection and only a few examples where physical asset data has been collected and used effectively.
Risk	Basic	Organisations in this sector are risk averse, especially with public reputation at stake. For their property assets, most organisations investigate and respond well to key risks, but corporate risk processes are not as well defined as for public entities.
Operational planning	Basic	Most organisations have a planned preventative maintenance programme, but also rely on local maintenance teams to respond to customer issues.
Capital planning	Core	Much of the focus in the sector is on growth planning for both new sites and increased capacity at existing sites.
Financial forecasts	Core	Organisations in this sector are not required to publish long-term financials. Financial planning for asset related investment tends to be short term for existing assets and longer term for new sites.
Asset management plans	Aware	Very few organisations have taken a planned approach to asset management in this sector, with only one organisation having completed a set of AMPs to guide decision making.
People	Basic	Property teams tend to have a centralised planning and control group along with local representatives to manage day-to-day issues. The sector does not appear to have as much of an issue securing staff to manage asset management functions as some other sectors.
Service delivery	Basic	Assets play a supporting role in the provision of private health sector services, and as such the facilities operational delivery is often reactive.
System and improvement	Aware	There is very little focus in this sector on the system of asset management or continuous improvement. There is no requirement to assess asset management maturity.

Table 15: Asset management maturity, Private health

Private health funding

MoH provides funding to private health providers, which supplement user-pays charges. The healthcare system operates under a mixed public-private model, where both public and private healthcare providers receive funding from the government. Additional funding is from the private sector and charitable organisations with little requirement for public disclosure outside of organisation-level annual reports.

Retirement villages are typically self-funded residential facilities, while aged residential care is closer to a hospital, with registered nurses on-site around the clock. Aged care organisations are the largest providers of healthcare in New Zealand, with around 40,000 beds compared to the public health system's 13,000 beds.

The care industry has long complained that chronic underfunding from central government has constrained growth and has reduced the number of beds available by 1100 in 2022. According to research firm BERL, the loss of beds doesn't bode well for a country needing about 15,000 new care beds by the end of the decade to service the ageing population (Newsroom, 7 Jan 2023).

Recommendations for private health sector

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to health: private
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: MoH has an oversight role in this sector, but that does not include asset management responsibilities.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is important in the sector, but with many players, the extent to which the organisations have appropriate asset management governance is unknown.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand's economy, and it is important that the public are given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The condition of existing assets is one performance measure that would be particularly useful for organisations to consistently measure and publicly report in this sector.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at	High relevance: There are very few AMPs developed in this sector.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to health: private
	least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: This is important to ensure that short-term commercial considerations do not override the priority of longer-term infrastructure resilience in this sector.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

There are no specific recommendations related to private health as they are covered by the key recommendations above.

Private health reference documents

- *Facility Guidelines Institute (FGI) Guidelines.*

16. Community: Social housing

Social housing sector overview

Social housing is the collective term for government state housing and local community housing. They both provide accommodation for people in need on the Social Housing Register.

Government state housing consists of rental accommodation provided by Kāinga Ora and Community Housing Providers. As of 31 March 2023, there were 78,064 public housing homes (65,889 Kāinga Ora and 12,175 registered Community Housing Provider properties.)

Many local councils also provide rental housing for those in need in their community. Of New Zealand's 67 territorial authorities (including city and district councils and unitary authorities), 62 referenced some type of housing-related activity in their LTPs. 60 out of 67 (90 percent) own housing stock, totalling 12,881 housing units as of November 2018. These 12,881 council-owned housing units equate to 14 percent of the total social housing currently available across the country.



Figure 27: Sector players, Social housing

Sector players

The **Ministry of Social Development (MSD)** works with people who need housing and financial support, manages the Housing Register (applicants for public housing), and administers the Emergency Housing Special Needs Grant.

Ministry of Housing and Urban Development (MHUD) is the government's primary advisor on housing and urban development. MHUD provides advice on policy and legislation, collects and shares data and insights, funds a range of programmes to deliver more housing and urban development where it is most needed, regulates community housing providers and monitors Kāinga Ora and the Tāmaki Regeneration Company (TRC).

Kāinga Ora is New Zealand's largest residential landlord and largest client of residential building services. Kāinga Ora partners with other agencies, local government, and iwi, as well as private partners, to deliver the Government's housing priorities and help develop sustainable, inclusive and thriving communities.

The **TRC** was formed in 2012 and is owned by the Government and Auckland Council. The Tāmaki Housing Association is part of TRC and has looked after the whānau that live in state housing in Tāmaki since 2016.

Community Housing Aotearoa (CHA) is the peak body for the community housing sector. CHA has 90 provider members housing approximately 25,000 people nationally across 13,000 homes.

The **Community Housing Regulatory Authority** registers and regulates community housing providers to ensure that their tenants are appropriately housed; and supports the growth of a fair, efficient, and transparent community housing sector.

Local authorities provide residential housing and housing for pensioners as well as social housing for those who are most in need.

Local Government New Zealand (LGNZ) provides a Social Housing Toolkit which is designed to be used by councils across the country to develop a response to social housing issues.

Community Housing Providers (CHPs) are typically not-for-profit groups that focus on a particular region, and invest in community housing for those most in need. The providers include Iwi, Māori, Pacific Island, religious and community groups and trusts.

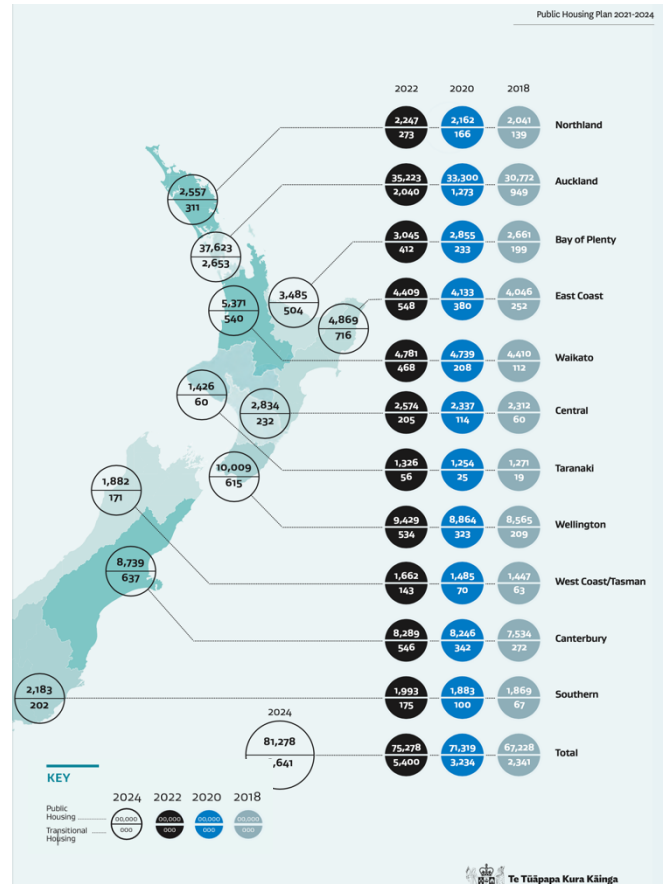


Figure 28: Public housing plan 2021-2024

Infrastructure asset performance

MHUD monitors performance of the CHPs through annual reporting, but this has a business and financial focus rather than infrastructure.

MHUD and MBIE monitor the implementation of the Healthy Homes Guarantee Act.

Very little information is publicly available about infrastructure asset performance in the social housing sector. Some asset condition is reported in LTPs by local government, but these are not consistent. There has been some poorly maintained social housing reported in the media, however housing providers have had until July 2023 to meet Healthy Homes Standards.

Sector challenges

The challenges faced by social housing sector are immense:

- Housing is a significant element of the household budget and an important determinant of the standard of living. The high cost of housing keeps families in a cycle of poverty, as insufficient income is left to meet other basic needs such as food, clothing, transport, medical care, and education.
- Rents and house prices in New Zealand have increased over the past twenty years at a much faster rate than household incomes. These days an average New Zealand house can cost six to eight times higher than household income, while three times is considered affordable.
- As a result of unaffordable housing, overcrowding issues and a poor housing stock, 300,000 New Zealand families are living in unacceptable housing conditions. Lack of heating and insulation means that homes are ill-equipped to deal with winter temperatures. These poor conditions are

linked to increased illnesses and infections, especially in young children. In addition, cold, damp homes cost a lot to heat, which is unaffordable for many low-income families.

- Our country remains in the grip of a housing crisis with a shortage of homes across the board, from affordable family homes to social and emergency housing.
- The cost of building houses is escalating, with inflation driven price increases making the cost of building new houses less and less affordable.
- COVID-19 resulted in resource shortages hampering the build process, sourcing materials took longer, and the construction sector faced an acute skills shortage.
- Planning and consenting processes are slow and cumbersome and can add time to development of new housing stock. Recent reforms are aimed at streamlining these processes, but are not yet in place. Other infrastructure is required to enable development and the links between planning and infrastructure creation are not always adequately in place.

Social housing asset management drivers

Legislation and regulation

The following legislation is relevant to (but not limited to) public housing:

- Part 10 of the Public and Community Housing Management Act 1992,
- Public and Community Housing Management (Community Housing Provider) Regulations 2014,
- Residential Tenancies Act 1986,
- Building Act 2004, and
- Privacy Act 2020.

The **LGA** required ten-year Long-Term Council Community Plans (now LTPs), stating levels of service, expenditure requirements and other elements of asset management for a period of ten years.

The Community Housing Regulatory Authority registers and regulates community housing providers, to ensure that their tenants are appropriately housed; and support the growth of a fair, efficient and transparent community housing sector.

Industry guidance

MHUD develops the Public Housing Plan (PHP) every three years, which sets out the government's public housing supply plans for the following four years.

The PHP focuses on building new public housing, with Kāinga Ora leading the delivery. Kāinga Ora also works with Community Housing Providers (CHPs), iwi and Māori and local government to deal with public housing shortages. The PHP sets out the following expectations for 2021-2024:

- more collaboration between MHUD, Kāinga Ora, iwi and Māori, CHPs, local government and the construction industry,
- more social housing in regional centres and towns where housing demand is growing the fastest,
- an increase in the number of new-build public housing and a progressive decrease in the proportion of private market homes that are leased for social housing, and
- target responses to different housing needs, especially for Māori, using Māori and Iwi Housing Innovation Framework for Action and place-based approaches.

In an effort to ensure the Housing 2030 Project – and resulting projects – target prioritised outcomes, LGNZ created a Supply, Social and Community Housing and a Growth Council Working Group.

Social housing asset management maturity

Asset management practices vary a lot in this sector, and there are organisations involved with different levels of maturity. Kāinga Ora and TRC both use the same asset management information system, as do some of the local authorities. Kāinga Ora has been on a journey since 2018 to increase their asset management maturity by:

- undertaking routine health and safety inspections
- digital site inspection data collection, and a standard inspection methodology
- immediate action of minor works to address health and safety issues, and flag critical works orders
- increasing asset data quality, and improved customer engagement and communication.

An overall summary of sector maturity is presented in Table 16.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	There are many pieces of overlapping legislation and guidance in this sector that need alignment. The PHP sets out the supply intentions for the public housing sector.
Levels of service	Core	Kāinga Ora sets out its levels of service in its annual statement of performance expectations. Local authorities set Levels of Service for residential and pensioner housing in their LTPs.
Demand	Basic	MSD maintains the housing register which is used for forecasting demand for public housing. Demand is captured at a regional level considering applicants on the housing, transfer, and emergency housing registers.
Evidence	Basic	MHUD produces a detailed quarterly report summarising the national system overview and regional supply and demand. The government housing dashboard tracks progress of key parts of the Government's housing programme.
Risk	Basic	Risk is mostly considered from a health and safety point of view. Risk is considered as a primary driver for renewal investment in some agencies.
Operational planning	Core	Operational planning is varied across the sector, but good practice is in place in the larger organisations. Generally good information is recorded about completed work and response to maintenance issues, which is used to inform longer term decisions.
Capital planning	Core	Renewal forecasts for component replacement is based on a multi-factor assessment in some organisations. There are major investment programmes for new builds with a variety of delivery mechanisms and partnering arrangements.
Financial forecasts	Basic	Financial forecasts are done reasonably well in the local housing sector through LTPs, central government reporting is not as consistent.
Asset management plans	Basic	AMPs and long-term financial forecasts are developed for government housing. Activity management plans are developed by local authorities for inclusion into council LTPs
People	Basic	Retaining and attracting the right skills sets across this broad sector is an ongoing challenge. There is currently much movement of central and local government staff.
Service delivery	Basic	Delivery of services is mixed across all portfolios, with some fully outsourced contracts to a blend of inhouse and informal external delivery.
System and improvement	Basic	Asset management maturity varies across the sector with many CHPs and local authorities all contributing to the system management. Process documentation and quality management has become an increasingly important issue as staff turnover increases and knowledge is lost when key staff leave.

Table 16: Asset management maturity, Social housing

Social housing funding

Social housing is funded by a mixture of rental income and Income Related Rent Subsidy, alongside funding from local authorities and central government budget funding.

Recommendations for social housing

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to community: social housing
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: HUD has an oversight role in this sector, but that does not include asset management responsibilities.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is important in the sector, but with many players, the extent to which the organisations have appropriate asset management governance is unknown.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand's economy, and it is important that the public given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: The condition of existing assets is one performance measure that would be particularly useful for organisations to consistently measure and publicly report in this sector.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There are very few AMPs developed in this sector.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to community: social housing
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: This is important to ensure that short-term commercial considerations do not override the priority of longer-term infrastructure resilience in this sector.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

There are no specific recommendations related to this sector as they are covered by the key recommendations above.

Social housing reference documents

- Infrastructure Commission, Te Waihanga: *The decline of housing supply in New Zealand: Why it happened and how to reverse it (2022)*
- Ministry of Housing and Urban Development (HUD): *Public Housing Plan 2021 – 2024*
- Ministry of Housing and Urban Development (HUD): *Public Housing Quarterly Report March 2023.*

17. Community: Community buildings

Community buildings sector overview

There are various types of community buildings that serve different purposes and cater to the needs of local communities. These buildings provide spaces for social, recreational, educational, and cultural activities. Common types of community buildings in New Zealand include:

- **Community centres:** Community centres are versatile buildings that serve as gathering places for the local community. They often host a wide range of activities, such as meetings, classes, workshops, sports, cultural events, and social gatherings. Community centres typically have multipurpose rooms, meeting spaces, kitchen facilities, and outdoor areas.
- **Libraries:** Public libraries are community buildings that provide access to a wide range of books, magazines, digital resources, and other educational materials. They also often offer spaces for studying, computer use, community events, storytelling sessions, and workshops. Libraries play an important role in promoting literacy, education, and community engagement.
- **Sports and recreation centres:** Sports and recreation centres are facilities dedicated to physical activities, sports, and leisure pursuits. These buildings may include indoor and outdoor sports courts, swimming pools, gyms, fitness studios, and spaces for group exercises. They provide opportunities for individuals and groups to engage in sports, fitness, and recreational activities.
- **Cultural centres:** Cultural centres are community buildings that focus on promoting and celebrating the cultural heritage and diversity of a specific community or groups within a community. These centres often host cultural events, exhibitions, performances, workshops, language classes, and other activities that preserve and showcase traditions, arts, and customs.
- **Youth centres:** Youth centres are dedicated spaces for young people to socialise, participate in recreational activities, and access support services. These buildings may have areas for games, music, arts, counselling rooms, and educational programs. Youth centres provide a safe and inclusive environment for young people to engage in positive activities and receive guidance and support.
- **Halls and meeting rooms:** Halls and meeting rooms are commonly found in communities and serve as venues for various events, gatherings, meetings, and functions. They can accommodate a range of activities, such as weddings, community group meetings, performances, and exhibitions.
- **Education and learning centres:** Education and learning centres include buildings such as adult education centres, vocational training centres, and community-based learning facilities. These buildings offer courses, workshops, and programs for individuals seeking further education, professional development, or skill enhancement.

Sector players

There are many types of ownership structure of community buildings:

- **Local government:** Many community buildings, such as community centres, sports facilities, and libraries, are owned and operated by local authorities, such as city or district councils. These buildings are typically funded, maintained, and managed by local government to serve the needs of the community.
- **Nonprofit organisations and community groups:** Some community buildings are owned and managed by nonprofit organisations, Iwi or community groups. These organisations may have a specific focus, such as cultural, social, or educational activities. Examples include marae, community-owned halls, cultural centres, or youth centres operated by community trusts or nonprofit entities.
- **Education institutions:** Educational institutions, such as schools, colleges, and universities, may own community buildings that are used for educational and community purposes. These buildings may include auditoriums, meeting rooms, or sports facilities that are accessible to the wider community outside of school hours. This sector does not include public or tertiary education facilities.
- **Religious organisations:** Religious organisations, such as churches, temples, or mosques, often own community buildings that serve as places of worship and community gathering spaces. These buildings may be used for religious ceremonies, community events, or activities organised by the religious group.
- **Corporate and commercial entities:** In some cases, community buildings may be owned by corporate or commercial entities. These buildings could be part of larger commercial developments or projects that include community spaces, such as shopping centres or mixed-use developments.

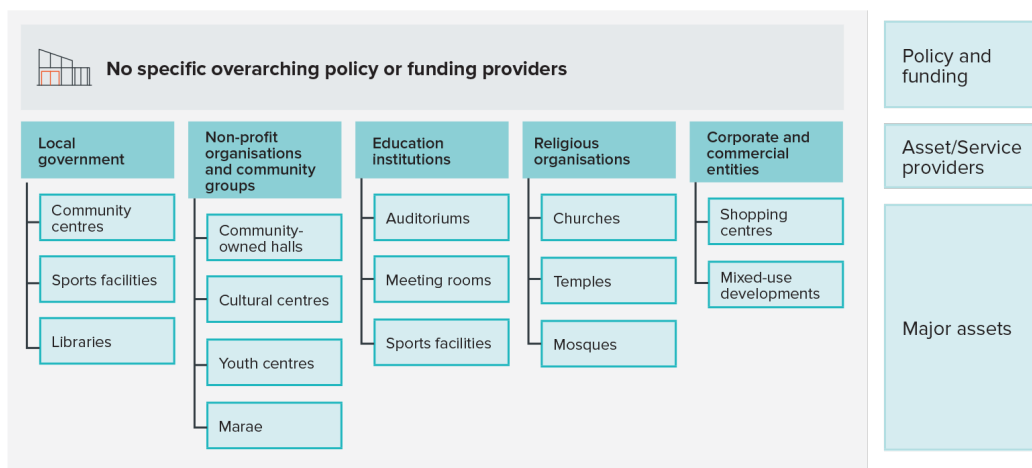


Figure 29: Sector players, Community buildings

Infrastructure asset performance

The network of community buildings facilitate community interaction, promote social cohesion, and support the well-being of residents. However, community buildings are often not as well maintained as privately funded buildings or other critical infrastructure. Community activities sometimes utilise buildings that were not designed for their purpose.

Sector challenges

Community buildings owned by local government organisations are often ageing, and not necessarily fit for purpose as needs change over time. There are many community buildings that do not meet New Building Standards (NBS) for earthquake engineering and a significant number that are earthquake-

prone (less than 33% of NBS), including a number with heritage value. Some of the buildings have been vested to local authorities to operate, without consideration of funding needs. Community buildings often struggle to compete for funding against other priorities such as transport and water.

As a result of underfunding existing community buildings and a focus on building new facilities, there is a large but unquantified level of deferred renewals. Some community buildings have a heritage status which prevents adaptation to current needs, are costly to maintain and, seismic strengthening is often considerably more complex and expensive.

There do not appear to be any systemic issues that prevent good asset management in the sector, other than the assets are generally considered to be less critical than some other sectors, and therefore there is a lower expectation of asset management maturity.

Community buildings asset management drivers

Legislation and regulation

LGA requirements for LTPs support asset management, but the 30-year Infrastructure Strategy is not required to include building infrastructure (some councils elect to include community buildings).

Industry guidance

Industry guidance is predominantly from IPWEA’s IIMM, the Āpōpō Guide, Facilities Management Association of New Zealand, and asset management educational courses.

Community buildings asset management maturity

Asset management practice varies widely between councils of different sizes, but is generally based on IIMM and asset management training programmes. LTP audits tend to focus on reviewing material issues and evidence in higher risk/value sectors such as water and roads, and often, though not always, the community buildings sector is lower priority.

The maturity rating and overviews of current practice is collated from several council asset management reviews undertaken in recent years by report authors. An overall summary of sector maturity is presented in Table 17.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Strategic analysis occurs as part of the development of AMPs, LTPs and other strategies, and are summarised in those documents. Asset management policies are in place in most authorities, though often not highly visible and the requirements aren’t well communicated across authorities.
Levels of service	Core	Buildings are generally in the public eye and demand for services is reasonably well understood. Both condition and fitness for purpose are equally important measures of asset performance in this sector. Most of the focus goes on condition assessment as opposed to fitness for purpose, but there are some good examples in the sector. Community consultation mostly occurs through LTP consultation processes; specific level of service / cost debate usually occurs only at the Council level, supported by varying quality of level of service options analysis.
Demand	Core	Generally, demand forecasting in the sector is relatively poor, although some asset types like libraries are very conscious of the changing customer expectations. There are some good recreational use forecasts developed and published in strategies, but these are not always funded.
Evidence	Core	The larger councils have better asset data than smaller councils, however data on community buildings is not usually as well collected as data on network infrastructure such as roads and waters.

Asset management function	Maturity	Overview of current practice
		Physical condition surveys are the most common form of performance monitoring for community buildings often using a three-year collection cycle. More advanced asset management teams use fit for purpose measures as well. A variety of asset management information systems are used, although many systems do not provide both an effective work order system and a renewal forecasting module.
Risk	Core	Local authorities generally maintain corporate risk policies, frameworks, and registers with activity-based risk registers for activities such as community buildings. Asset criticality is not often well understood or used to prioritise operational activity.
Operational planning	Core	Operational decisions are sometimes more reactive than planned for councils with a lower level of asset management maturity.
Capital planning	Core	Community building renewals often struggle to compete for capital funding against new developments and against high profile network infrastructural needs. Capital projects prioritisation is often defined by a corporate LTP process.
Financial forecasts	Core	Ten-year financial forecasts are in place for all authorities, though the robustness of these varies. Community buildings are valued on a three-year cycle, with annual valuations undertaken if there are significant changes.
Asset management plans	Basic	A key challenge is the process for the integration of AMPs and LTP forecasts and transparent discussions around budget prioritisation. Some smaller councils do not have AMPs for community buildings.
People	Core	Capability and capacity are a significant issue, as for most other sectors. Lack of strong leadership and role definition are often contributors to poorly executed asset management improvement plans, and the need for strong cross-Council coordination of asset management functions.
Service delivery	Basic	Service delivery is mixed across the sector with some in-house and some contracted facilities management providers or small-scale maintenance teams.
System and improvement	Core	Process documentation and quality management is commonly poorly managed. This has become an increasingly important issue as staffing 'churn' increases as knowledge and processes are lost when key staff leave. Many of the larger local authorities have some form of asset management improvement plan as part of their AMP, usually based on asset management maturity assessments to identify gaps. However, implementation of these plans is generally poor, due to financial and people constraints.

Table 17: Asset management maturity, Community buildings

Community buildings funding

Funding is from rates and user charges for local government-owned buildings. There are also some buildings that have secured private or trust funding. COVID-19 restrictions on access to community buildings, and the resulting reduction in revenues, impacted on the ability of councils to sufficiently maintain some community buildings, which also compete with other activities in council for funding.

Recreation facilities owned by local authorities have generally received more funding than community buildings, because they are part-funded by user entry and membership fees.

Consequential opex required to maintain and operate new facilities is often underestimated or omitted from ongoing budgets.

Recommendations for community buildings

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to community: community buildings
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There are many players in this sector and little consistency of asset management practices.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is important in the sector, but with many players, the extent to which the organisations have appropriate asset management governance is unknown.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: There are some smaller players in the sector that have insufficient resources to undertake an asset management maturity assessment.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: There is little consistency in reporting of asset performance measures and some organisations in this sector do not report any.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: There are some AMPs developed in this sector, but many are not publicly disclosed.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Community buildings are often important during emergency events and need to ensure a high level of resilience.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

There are no specific recommendations related to community buildings as they are covered by the key recommendations above.

Community buildings reference documents

- Office of the Auditor-General: *LTP findings, 2021*.

18. Community: Parks and open spaces

Parks and open spaces sector overview

This section focuses on publicly owned parks and open spaces managed by local and regional government. DoC manage conservation lands and national parks, and this is covered in the land and forestry sector in this report.

The infrastructure assets in this sector include land that is dedicated as reserve, and associated assets such as playgrounds, refuse, toilets, park buildings, underground water and power assets and jetties. Green assets such as trees, grass, and plantings are not included in the scope of this report.

Sector players

Local government: Local authorities own and manage parks at the local level. Each region has several local councils that oversee public spaces, including parks and reserves, within their respective jurisdictions.

Regional councils: Regional councils are responsible for managing natural resources, including parks and open spaces, on a regional level. They often own and operate regional parks, which provide recreational opportunities and protect significant environmental areas.

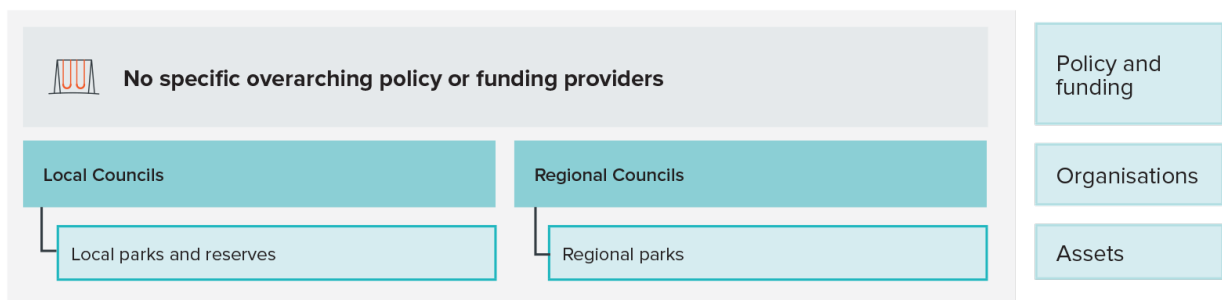


Figure 30: Sector players, Parks and open spaces

Infrastructure asset performance

Infrastructure assets in this sector are not considered to be as critical as some other sectors, and the level of asset performance reflects that. Assets are sometimes managed on a run-to-fail basis, unless there are safety risks.

Sector challenges

Park assets have to compete with other council assets for funding and are not considered to be as critical as other infrastructure such as roads. The LGA does not require the inclusion of parks and open spaces in the Infrastructure Strategies developed as part of council's LTPs.

The cost of land has increased significantly over the last twenty years which has limited the ability of councils to purchase new land and has put additional financial pressure on councils to retain land.

Legislated Reserve Management Plans recommend strategies that are not always aligned or delivered through AMPs.

There do not appear to be any systemic issues that prevent good asset management in the sector.

Parks and open spaces asset management drivers

Legislation and regulation

Local authorities have had the LGA requirements for LTPs that support asset management.

Industry guidance

Industry guidance is predominantly from IPWEA's IIMM, the Āpōpō Guide, and asset management educational courses. Some local authorities use "Yardstick" (nzrecreation.org.nz) to benchmark their provision of services.

Parks and open spaces asset management maturity

Practice varies widely between councils of different sizes but is generally based on IIMM and asset management training programmes. LTP auditors tend to focus on reviewing material issues and evidence of the higher risk/value sectors such as water and roads, and often, though not always, sectors like parks, are subsidiary. Along with community buildings, parks and open space assets are less critical than other infrastructure assets and the asset management practices reflect that. However, LGA requirements for asset management evidence to support the LTPs, means that asset management maturity of this activity is higher than some non-local government infrastructure providers.

Although parks and open spaces asset management maturity is often lower than other council activities, the engineering requirements are often less complex, and there is wide variability in asset management maturity between parks activities in councils across the country.

An overall summary of sector maturity is presented in Table 18.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Strategic analysis occurs as part of the development of AMPs, LTPs and other strategies, and are summarised in those documents. asset management Policies are in place in most authorities, though often not highly visible and the requirements aren't well communicated across authorities.
Levels of service	Core	Yardstick benchmark performance measures have been used in the past to compare local government levels of service. These are nationally and internationally collected and consistent measures. Community consultation mostly occurs through LTP consultation processes; specific level of service / cost debate usually occurs only at the Council level, supported by varying quality of level of service options analysis.
Demand	Core	Demand forecasting is relatively poor and there is no consistent national agreement on an appropriate level of provision of parks space. Some councils have been using a proximity or travel time to a park in urban areas to assess the need for additional space. There is increasing demand for safer playgrounds and more basketball courts and skate parks.
Evidence	Core	The larger councils have better asset data than smaller councils, however the quality of asset data on parks is variable. Operational maintenance teams are the most common form of performance monitoring for parks, however the feedback from those teams is often not collected in a systematic way. Some councils undertake physical condition surveys of parks assets. A variety of asset management information systems are used, although many systems do not provide both an effective work order system and a renewal forecasting module.
Risk	Core	Local authorities generally maintain corporate risk policies, frameworks and registers with activity-based risk registers for activities such as parks and open spaces. Asset criticality is not often well understood or used to prioritise operational activity.
Operational planning	Core	Operational decisions are sometimes more reactive than planned for councils with a lower level of asset management maturity.

Asset management function	Maturity	Overview of current practice
Capital planning	Core	Parks asset renewals often struggle to compete for capital funding against new developments and against high profile network infrastructural needs. Capital projects prioritisation is often defined by a corporate LTP process.
Financial forecasts	Core	Ten-year financial forecasts are in place for all authorities, though the robustness of these varies. A key challenge is the process for the integration of AMPs and LTP forecasts and transparent discussions around budget prioritisation. Parks assets are valued on a three- year cycle, with some annual valuations where costs fluctuate significantly.
Asset management plans	Core	Most councils have AMPs for parks and open spaces.
People	Core	Capability and capacity are a significant issue, as for most other sectors. Lack of strong leadership and role definition are often contributors to poorly executed asset management improvement plans, and the need for strong cross-council coordination of asset management functions.
Service delivery	Core	There is often a mix between council owned service provision and contractors.
System and improvement	Core	Process documentation and quality management is commonly poorly managed. This has become an increasingly important issue as staffing 'churn' increases as knowledge and processes are lost when key staff leave. Many of the larger local authorities have some form of asset management improvement plan as part of their AMP, usually based on asset management maturity assessments to identify gaps. However, implementation of these plans is generally poor, due to financial and people constraints.

Table 18: Asset management maturity, Parks and open spaces

Parks and open spaces funding

Funding is from rates and user charges. Development contributions can also fund new growth projects. This has required very explicit reporting of the growth component of capital projects over the ten-year planning period by councils.

Many councils report that there is insufficient funding set aside for the ongoing maintenance and operation of park assets vested by developers.

Recommendations for parks and open spaces

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to community: parks and open spaces
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There is currently no system lead for asset management in this sector.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: It is important that local and regional authorities recognise the importance of asset management at a governance and executive level.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to community: parks and open spaces
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Some authorities are undertaking asset management maturity assessments, but they are not mandated.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Although Yardstick measures have provided some consistency, they are not always publicly reported.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Most authorities develop an Open Spaces AMP, but they are not always publicly disclosed.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: This is particularly applicable to coastal park assets that are subject to extreme weather events and sea-level rise.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

Additional recommendations for parks and open spaces are:

1. Develop a national guideline measure for the provision of park spaces.

There are a number of different methodologies in use by councils to assess whether they are providing sufficient park space and to identify gaps. A nationally agreed methodology would allow greater comparison with other council areas.

2. Consider legislative LGA amendment to include parks and open spaces in published Infrastructure Strategies.

Some councils do include this activity in Infrastructure Strategies, but it is not mandatory. Land purchase costs for new parks are significant and should be included in the Infrastructure Strategy.

3. Better use of performance measures, such as Yardstick, to assess asset management success.

More consistent measurement would allow comparison across councils and help highlight good or poor practice.

Parks and open spaces reference documents

- Office of the Auditor-General: *LTP findings, 2021.*

19. Education: Primary and secondary

Primary and secondary education sector overview

The total number of schools (state, state-integrated and private) in New Zealand as of 1 July 2023 was 2,538.

There are 2,117 state (non-integrated) schools, which include 1,678 primary, 286 secondary, 117 composite, and 36 specialist schools. There are 228 state-integrated schools, including 228 primary, 70 secondary and 35 composite schools, and there are 88 private schools of which 29 are primary, 18 are secondary and 41 are composite schools²⁰. Private and state-integrated school buildings are not owned by the Ministry of Education (MoE), and these are not included within the scope of this report.

The MoE school property portfolio contains around 16,500 buildings, 36,000 teaching spaces, and 9,000 hectares of land, with a replacement value of approximately \$43 billion, and is the second largest social property portfolio in the country.

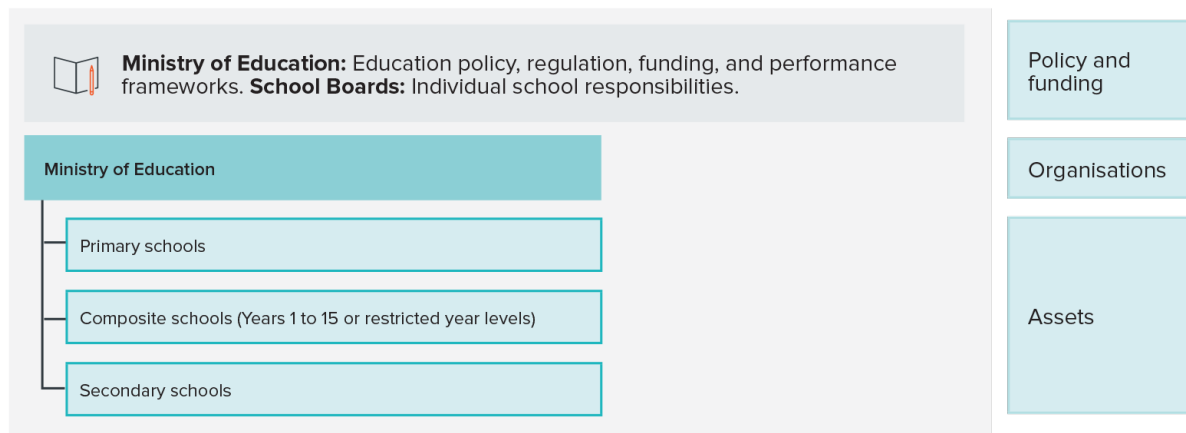


Figure 31: Sector players, Primary and secondary education

Sector players

School property management operates under a semi-devolved model, with **school Boards of Trustees** responsible for day-to-day management and maintenance of school property.

MoE is responsible for the ownership and funding of public-school buildings and grounds throughout the country. The Ministry's role involves strategic and operational planning, funding allocation, investment and policy development, related to school property. The Ministry works closely with schools to support their property needs. The Ministry provides guidance and direct support to schools regarding property matters, including the development of property plans, procurement, design and construction, and maintenance initiatives.

Infrastructure asset performance

Infrastructure assets include buildings, containing classrooms, laboratories, gymnasiums, theatres, libraries, as well as land, containing playgrounds, courts and sports fields, that together constitute learning environments. ICT in schools is considered out of scope for this project.

School buildings and infrastructure enable the delivery of educational services. Physical attributes, such as adequate heating, ventilation, and enough outdoor and green space, help create learning and

²⁰ [Number of schools | Education Counts](#)

teaching environments conducive to positive educational outcomes. The quality of education infrastructure is also likely to, in part, have an impact on the attraction and retention of teaching staff.

The performance of education building stock is mixed, with some ageing and not fit-for-purpose buildings. Teaching pedagogy change has also led to greater requirement for learning environments to be flexible for a variety of teaching approaches. Asset performance measures in the 2022 Annual Report show 89% of state schools meet the Ministry's condition standards, and 77% meet the corresponding functionality standards, while 70% of State schools are within the target range for utilisation.

Over the past decade, the Christchurch earthquakes required a large rebuilding programme, and much of the new growth in existing and new schools has been focused on urban centres. There has also been a focus on rebuilding end-of-life buildings, some of which were caused by inadequate maintenance practices and weather-tightness failure.

Sector challenges

The key challenges facing the sector are:

- variability in physical stock,
- inconsistent maintenance practices,
- areas of strong population growth putting pressure on existing capacity while other areas of population decline creating surplus property, and
- recent construction market volatility contributing to affordability pressures.

Primary and secondary education asset management drivers

Legislation and regulation

Asset management requirements were identified under the Cabinet Office Circular CO(19)6 Investment Management and Asset Performance in the State Services but as stated in the sector settings section, there are no compliance checks by Treasury or Audit. The updated Cabinet Office Circular CO(23)9 requires Chief Executives to attest that the circular requirements are met. Education is also subject to a standard range of legislation and regulation including building compliance under the Building Act 2004 and associated regulations.

Industry guidance

MoE has developed resources and processes for school property planning.

Primary and secondary education asset management maturity

The Ministry of Education has been subject to the Treasury Asset Management Assessment Maturity process through the Investor Confidence Ratings, and the latest rating from the 2018 assessment was "intermediate". The Ministry has continued to undertake annual internal assessments in the years since the last Treasury review. The assessments were completed internally and were based on an earlier version (2016) of the IIMM AMMA. There was a substantial overhaul of the assessment methodology in 2020. The 2020 AMMA requires embedded asset management practice to be evidenced for ratings above "aware". In general, a rating of "intermediate" in the 2016 AMMA is likely to relate to "core" or even "basic" in the 2020 AMMA. The following is a moderated view reflecting the authors' assessment of how the 2020 methodology would apply.

An overall summary of sector maturity is presented in Table 19.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Strategic analysis occurs as part of the development of Statements of Intent and high-level organisational strategies, but asset management is not always well represented in strategic decision making. MoE has a well-defined property strategy and is in the process of developing a National Property Plan. Asset management policies are in place, though often not highly visible and the requirements aren't well communicated.
Levels of service	Core	MoE has developed a levels of service framework, including technical and customer measures and reports high level asset performance measures externally through the Annual Report. Some measures are still limited by availability of data and the Ministry has an improvement programme aimed at improving the quality and use of the measures.
Demand	Intermediate	Demand forecasting is carefully scrutinised, and plans are in place to build new schools and increase capacity in others. There has been some rationalisation of property where there is under-utilisation, further rationalisation is limited by treatment of demolition as operational expense.
Evidence	Core	The sector has collected high-level portfolio-wide asset condition information and conducts more detailed condition assessments where major investment decisions are needed. The Ministry has a programme in place to improve the quality and usefulness of asset related data across condition, fitness for purpose and operational efficiency.
Risk	Core	MoE operates an enterprise risk management framework. In school property, risk management operates under a mix of proactive measures, for example through school level planning, and reactive responses, for example where events such as earthquakes or major weather events occur.
Operational planning	Core	Operational decisions such as quantity/type of planned maintenance and maintenance intervention strategies are usually made based on professional knowledge informed by available defect, condition, and other performance data.
Capital planning	Core	Funding portfolios and programmes have been developed to address infrastructure requirements in a systematic way. MoE receives depreciation funding to support long-term renewal of the portfolio, including through funding direct to schools, but this has been declining relative to the scale, age and condition of the school infrastructure portfolio. The Ministry has a deferred liability backlog which it is trying to address but is increasingly reliant on capital injection through the annual Budget process to do so. Funding investment in growth and transformational investments is also through Budget for which there is also high demand.
Financial forecasts	Core	MoE maintains a ten-year financial forecast of its capital investment and corresponding funding needs. It updates this regularly as new information comes to light and following its annual planning cycle, which considers both school-led and Ministry-led investment intentions. The long-term nature of investment planning doesn't align well with the short-term Budget cycles because medium-longer term intentions are often subject to future Budget decisions.
Asset management plans	Core	Every school has a ten-year property plan which identifies the plan for addressing maintenance and renewals requirements. Initiatives are underway to improve the quality of school property plans. The Ministry is also developing regional and national property plans, which are integrated with its annual investment planning cycle.
People	Core	Capability and capacity are a significant issue, as for most other sectors. Lack of strong leadership and role definition are often contributors to poorly executed asset management improvement plans, and the need for strong cross-organisational coordination of asset management functions. Asset management is often not well represented at senior leadership.
Service delivery	Core	Responsibilities have been split between MoE and school boards; however, the Ministry is establishing a stronger focus on local service delivery, including integrating school property management to ensure education, network demand and asset management needs are driving property decision-making.
System and improvement	Core	Process documentation and quality management is inconsistent. MoE has been through the ICR process, and the asset management practices have benefitted from the spotlight that has been shone on them in the past.

Table 19: Asset management maturity, Primary and secondary education

Primary and secondary education funding

Historically, most investment in education infrastructure was formula-driven and not necessarily based on asset management practice. Over the past ten years, investment has increasingly been targeted

towards identified infrastructure needs. The proportion of funding that is formula-based is now lower and is targeted towards essential infrastructure needs through the ten-year school property planning process.

The asset values for schools have been consistently revalued upwards, and this has led to more depreciation funding being available for re-investment, although in recent years parity has not been maintained.

Recommendations for primary and secondary education

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to education: Primary and secondary
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There is no central government system lead for asset management.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Given the size and complexity of school assets these needs to be supported through governance and executive layers.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Since the ICR has been dis-established, there is no assessment of asset management maturity and no transparency of practices.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: A consistent set should be complemented by specific education asset performance measures.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: It is not clear whether AMPs are in place.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to education: Primary and secondary
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: Resilience levels across critical education infrastructure should be identified along with targets with investment plans. Education buildings have fared better in extreme events and design standards are in place.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination. Existing new schools programme could be leverage in other government sectors.

Additional recommendations for primary and secondary education are:

1. Continue with asset management improvements captured in the MoE Property Strategy.

The strategy contains several key improvements at the Ministry level that will improve the quality of data and decisions being made.

Primary and secondary education reference documents

- CO(23)9 Cabinet Office Circular
- Infrastructure Commission, Te Waihanga: *Sector State of Play: Education*.

20. Education: Tertiary

This report reflects the structures of the sector as at the end of 2023. Subsequent structural changes, for example the process underway to disestablish Te Pūkenga, are not reflected. These changes hadn't had a material impact on the underlying levels of asset management at the time of writing this report.

Tertiary education sector overview

Tertiary assets mainly comprise land and buildings, plant and equipment including laboratories, ICT, and other specialised teaching facilities. Intellectual property and intangible assets are out of scope for this report. There have been regular condition assessments of assets to ensure better utilisation, fit-for-purpose campuses and value-for-money.

Given the emerging and new flexible learning and teaching practices in tertiary education, a focus has been reconfiguring existing buildings to adapt to these practices. New builds are also taking this into account so that better asset utilisation can be achieved, to cater to fluctuating student numbers, and to moderate the requirements for more new buildings.

There are eight universities that have their own governance structures, and own or lease their infrastructure. An analysis of the eight universities' 2023 Annual Reports show they collectively have combined carrying value of property, plant and equipment of \$14.3 billion.

The sector is largely dominated by the eight universities, having five times the combined asset size of Te Pūkenga. Te Pūkenga started in April 2020, and oversaw the operations of 16 Institutes of Technology and polytechnics and nine Industry Training organisations. It established a Capital Asset Management and Infrastructure Committee. The 2023 Te Pūkenga Annual Report noted that the organisation had \$2.4 billion of plant, property and equipment. Note that since the drafting of this report, Te Pūkenga has been in the process of being disestablished.

Established in 1984, the Wānanga sector is made up of three entities, and is a uniquely Māori learning environment with over 80 locations nationwide, offering certificates, diplomas, degrees and a master's degree. The value of the Wānanga sector property, plant and equipment in 2023 was \$209,000.

Sector players

MoE has responsibility for tertiary education policy and legislation, and it develops the Tertiary Education Strategy. The **Tertiary Education Commission (TEC)** has oversight and funding accountability and "good practice" role.

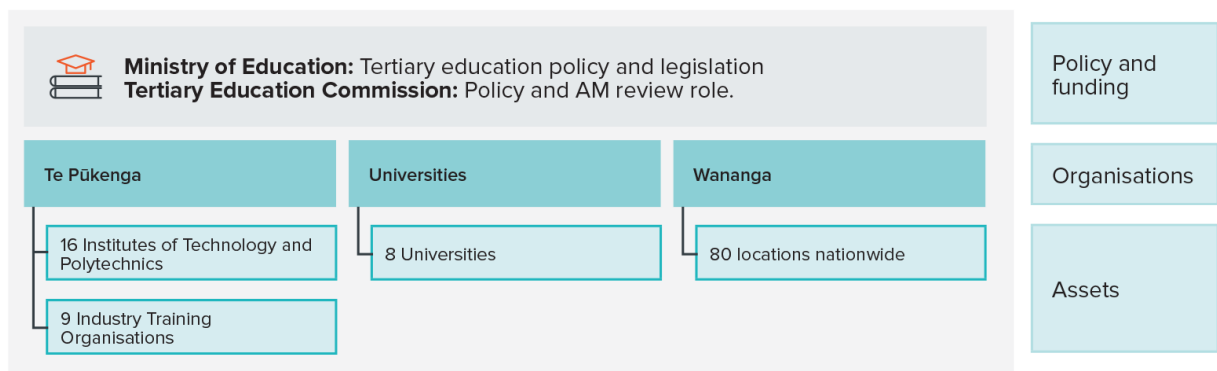


Figure 32: Sector players, Tertiary education

Infrastructure asset performance

The physical infrastructure assets of the sector comprise mainly land, buildings, building services and plant and equipment. Most institutions have had asset condition assessments of variable quality and, until relatively recently, assets have supported levels of service. Recent student number downturns, including overseas student number decline during COVID, put the focus on the continuation of certain courses, which impacted on the requirement for the infrastructure that supports them.

Sector challenges

The sector issues are:

- Te Pūkenga started to take a nationwide view of asset management requirements. The 2023 asset management assessment conducted by independent assessors confirmed that asset requirements are now looked at with a national view.
- The sector has a challenging task in managing large building assets (especially high-rise) that were mainly built between the 1950s to 1980s, and that are now not meeting current seismic standards, nearing the end of their usefulness, becoming unsuitable for modern teaching, and learning practices, and failing health and safety standards. Institutions have been gradually addressing these issues with available funds over the last two decades.
- All organisations in this sector need to be agile in re-configuring assets to changed learning environments
- Funding is a major factor given the government does not provide capital funding to the sector except in exceptional circumstances, such as the Christchurch earthquake when capital funds were provided to rebuild/replace buildings damaged by the earthquake. The sector must therefore raise these funds through internal cash flows, limited asset sales, commercial borrowing and, in limited cases, government loans. There is additional pressure on funding, partly through fewer overseas students and changing demand.
- Forecasting needs and understanding appropriate service levels.

Tertiary education asset management drivers

Legislation and regulation

- Under the Education and Training Act 2020, there is a legislative responsibility for managing assets.
- The Treasury Cabinet Circular CO(23)9, sets out expectations for managing investments and both physical and intangible assets, including the requirement for AMPs and asset performance data in annual reports.
- Ten-year capital intentions and an Investment Plan are submitted annually and they are required to assess their capital asset management capability against agreed standards and practices. Assessments alternated between an independent assessment one year and a self-assessment the next year.
- The OAG in 2017 published a report, Investing in Tertiary Education Assets, which included reviewing 14 business cases.
- Audit NZ, also in 2017, reviewed the asset management practices of tertiary institutions and identified areas of improvement.

Industry guidance

- TEC has developed good practice guidance covering a wide spectrum of asset management aspects. This includes capital asset management tools and templates and guidance to assess the asset management capability of TELs.
- The Australasian body, the Tertiary Education Facilities Management Association (TEFMA) which runs workshops, conferences and issues good practice on facilities management and optimal space utilisation.

Tertiary education asset management maturity

An overall summary of sector maturity is presented in Table 20.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Organisations in this sector generally have asset management policies and AMPs in place, aligned to organisational direction.
Levels of service	Core	Levels of service settings and measurement is relatively well established in the sector, with common use of TEFMA benchmarking metrics.
Demand	Core	The sector is acutely aware that changes to student numbers impacts on teaching spaces and configurations. The sector is grappling with fast changing demand dynamics
Evidence	Core	Asset registers are in place, but the extent of condition assessments varies.
Risk	Core	Risk management frameworks are in place in the sector, and are generally well used.
Operational planning	Basic	Audit NZ identified asset management links to service and financial planning was one of two areas with the greatest scope for improvement. Recently (March 2023) the OAG noted that Te Pūkenga needed to do considerable work to complete its operational model.
Capital Planning	Basic	While core capital planning processes are evident in Universities, Te Pūkenga still had some improvement required in its capital planning.
Financial forecasts	Basic	Financial forecasts are focused between four and ten years. The extent of sophisticated forward financial analysis (for example, on planned maintenance) is still an improvement area.
Asset management plans	Core	Universities have AMPs and asset management policies. The disbanded polytechnics generally had AMPs but these were being reconfigured in the Te Pūkenga environment.
People	Core	Facilities personnel are capable and competent. However, their influence and impact as regards strategic asset management is often overshadowed by other disciplines.
Service delivery	Core	As public sector entities, there are transparent procurement policies.
System and improvement	Basic	Improvement plans are evident for most universities. An independent asset management assessment of Te Pūkenga in 2023 found that overall, the level of maturity was core and that it will take considerable time to reach where it aspires to be.

Table 20: Asset management maturity, Tertiary education

Tertiary education funding

Funding for the tertiary sector is a mix of government funding, fees and other revenue. Tertiary institutions are Crown entities. They are not fully funded by government and rely on many other external sources for funding to manage their operations and invest in capital demands, as follows:

- For Te Pūkenga, revenue for the 2023 year was \$1.37 billion, of which \$891 million was from Government tuition funding, \$294 million from student tuition fees and \$213 million from research and other income.
- Using Auckland University as an example, as the largest New Zealand university, revenue for the 2023 year was \$1.56 billion, of which \$430 million came from government tuition funding, \$402 million from student tuition fees and \$732 million from research and other income.

Recommendations for tertiary education

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to education: Tertiary
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	Low relevance: TEC fulfils this role in the sector and oversees asset management maturity and guidance.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is important in the sector, but with many players, the extent to which the organisations have appropriate asset management governance is unknown.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: This is already undertaken by TEC.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: This is relatively well done by universities, but the measures are not necessarily available for public scrutiny.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Tertiary institutes often develop AMPs, but they are not often made publicly available.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to education: Tertiary
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: This is important to ensure that short-term commercial considerations do not override the priority of longer-term infrastructure resilience in this sector.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

There is a pressing need for asset management to be re-invigorated in the light sector changes and previous individual asset management activities may have stalled.

The specific recommendations for the tertiary education sub-sector are:

1. That there is a closer and quicker alignment between demand information at institution level (particularly student number predictions) and reconfiguring spatial and facility needs.

There appears to be growing gap between existing facilities and the numbers and needs of students. This needs to be addressed as we may end up with underutilised or poorly configured facilities.

Tertiary education reference documents

- *Education and Training Act 2020*
- *Cabinet Office Circular CO(23)9*
- *Good asset management practice issued by the Tertiary Education Commission (TEC)*
- Office of the Auditor General: [Investing in tertiary education assets.](#)

21. Other sectors: Defence

Defence sector overview

New Zealand Defence Force (NZDF) includes the Army, Air, and Navy forces. The 2022 NZDF Annual Report notes the carrying value of property, plant and equipment is \$8.3 billion, of which \$4.2 billion is Specialist Military Equipment (SME), buildings is \$2.8 billion, land is valued at \$1.1 billion, and plant and equipment is \$260 million.

An analysis of the 2022 carrying values, shows that SME is 38% through its useful life, and plant and equipment is 52% through its useful life, on average. The 2022 NZDF depreciation, amortisation and impairment expense was \$558 million. The capex in 2022 of \$1.18 billion was mostly on SME (75%) and land and buildings (20%).

Sector players

The role of the **Ministry of Defence** is to:

- provide policy advice to Government,
- purchase major defence equipment, and
- advise on the NZDF’s functions, duties, and projects.

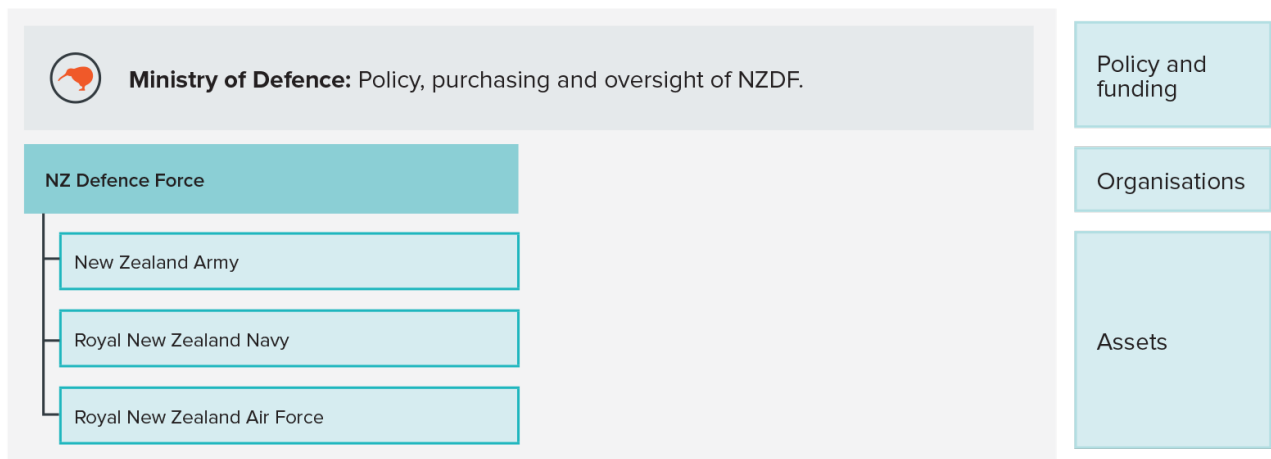


Figure 33: Sector players, Defence

Infrastructure asset performance

Estate (land and property) assets are ageing, often not in good condition and are not meeting performance standards. Major investment is programmed on a multi-year basis. The investment needs significant resourcing in terms of capacity and capability to achieve goals.

The 2022 NZDF Annual Report shows that, for critical estate assets, only 57% are rated as in “average or better” condition against a target of >70%. In 2022, about 20% of asset maintenance projects were impacted by COVID-19 and related circumstances. However, 1,120 of 1,405 defence houses have been upgraded to Healthy Home Standards

Sector challenges

The sector issues identified are:

- Replacement of ageing estate and infrastructure. NZDF estimate that as much as 80% of the Defence Estate has less than 30 years remaining life. Performance standards for existing estate assets are below target levels.
- Through an alliance contract, estate regeneration projects are set to deliver \$2.1 billion of projects in the next 10 years across the entire NZDF. Phase 1 work includes work on the Ohakea Air Base and Burnham Military Camp. In total, there is an estimated \$5.88 billion required to regenerate the estate by 2030.
- New SME assets can rarely be funded from existing depreciation because of long lead times and the bespoke nature of acquisitions.
- NZDF noted, in their 2022 Annual Report, a number of SME asset performance issues affecting readiness stem from the ageing of assets and the maintenance burden.
- Contamination of land is a major issue with asbestos and soil contamination at bases and residential properties.

Defence asset management drivers

Legislation and regulation

Legislation and regulation relevant to the sector includes:

- Defence Act 1990,
- Resource Management Act 1989, and
- Cabinet Circular CO(23)9, including updated expectations for managing investments and both physical and intangible assets including the requirement for AMPs and asset performance data in annual reports.

Industry guidance

A professional services alliance is into its third year and is embedding private sector asset management expertise.

In early 2022, the Navy entered an eight-year Maritime Fleet Sustainment Service contract with Babcock Limited. This is to provide the full suite of asset management activities for its Navy Fleet.

NZDF estate management is aiming to gain ISO 55001 alignment for asset management.

Defence asset management maturity

Treasury's ICR gave Defence a 73 rating (B) in round 1 of the assessments and 79 (also a B) in Round 2. An overall summary of sector maturity is presented in Table 21.

Asset management function	Maturity	Overview of current practice
Strategic direction	Intermediate	NZDF estate management has signalled its intent to be ISO 55001 aligned and has developed an overall strategic direction in asset management.
Levels of service	Core	NZDF has developed levels of service expectations for its estate and SME assets and measures performance against expectations. However, these are not seen as sophisticated.
Demand	Core	NZDF has performed extensive work on the long-term needs demanded by SME and the defence estate.
Evidence	Intermediate	The condition, use and functionality of SME and estate assets is measured annually.
Risk	Intermediate	Risk management templates are used in asset management There has also been work done on soil contamination, resilience, seismic risk, and asbestos.

Asset management function	Maturity	Overview of current practice
Operational planning	Core	Operating plans are generally available for all operational areas. Work is organised into unscheduled and scheduled work, planned projects.
Capital planning	Intermediate	Formal options analysis and business case development has been completed for major projects. Major capital projects are identified, and broad cost estimates are available.
Financial forecasts	Intermediate	Depreciated replacement cost valuations aligned to asset information used forecasts. Property related depreciation is ring-fenced to property expenditure. Asset expenditure categories are suitable to enable asset management costing / forecasting analysis.
Asset management plans	Intermediate	There are geographic AMPs as well as asset class AMPs. Recently NZDF produced a waters AMP covering both "three waters" and natural water.
People	Core	A reduction in recent years of skilled experienced project management staff is slowing project delivery and therefore impacting on asset management.
Service delivery	Intermediate	The professional service alliance and the sustainable maritime service contract are seen as innovative features to enhance asset management. Security and industry capacity issues sometimes hamper the efficiency of contractor involvement.
System and improvement	Core	Defence has shown a commitment to improvement initiatives and systems innovation.

Table 21: Asset management maturity, Defence

Defence funding

- 96% of NZDF funding is from the Crown (\$3.1 billion in 2022).

Recommendations for Defence

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Provider)	Relevance to other sectors: Defence
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: The Ministry of Defence has an oversight role in this sector, but that does not include asset management responsibilities.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: This is important in the sector, but is in place for NZDF.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The infrastructure assets in this sector are critical to New Zealand's economy, and it is important that the public given visibility on the maturity of asset management.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to	Low relevance: NZDF has a set of performance measures which it acknowledges could be improved,

	Key Recommendations (*MIPS = Major Infrastructure Provider)	Relevance to other sectors: Defence
	external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	however given the unique nature of activities, there is limited value in ensuring consistency with other infrastructure providers.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Low relevance: Although the development of AMPs is important, they are in place within NZDF but do not require public disclosure due to security classification.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	Medium relevance: This is important, but is already considered a priority by NZDF.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	Low relevance: With one organisation responsible for activities in this sector, the need for coordinated regional planning with other players is considered low.

The specific recommendations for Defence are:

1. NZDF to focus on additional efforts to recruit and retain a skilled workforce capable of meeting the full spectrum of asset management requirements.

There have been challenges to retaining skilled asset management personnel. While external resource has helped there must be continuous efforts to recruit and retain a skilled workforce.

2. Build and learn from the alliance contract and outsourced maritime service delivery which are promising improved asset management practices.

The alliance contract is into its fourth year, and the learnings from this and from the outsourcing of external asset management expertise in maritime services, may lead to other similar service delivery initiatives for other defence activities.

3. Continue to improve data quality.

Data quality has improved but is still a work in progress. Given the value and importance of Defence assets this aspect of asset management should be emphasised.

Defence reference documents

- *Cabinet Office Circular CO(23)9.*

22. Other sectors: Land and forestry

Land and forestry sector overview

This sector includes Crown-owned land such as DoC managed land (approx. 8.6 million hectares), including national parks, and LINZ-managed Treaty settlements landbank and Crown Pastoral leases (approximately 2 million hectares). It also covers forest management of both current and previously owned Crown forests and private forestry. There are approximately 1.7 million hectares of plantation forestry in New Zealand. Nearly 40% of New Zealand is covered in forest²¹.

Land use and the availability of land has a significant impact on both infrastructure provision and impacts on other infrastructure. This was abundantly clear in Cyclone Gabrielle in February 2023, where forestry slash damaged the environment and risked human safety, including significant damage to bridges. Land use also has a direct impact on water quality. A Ministerial inquiry on land use associated with woody debris and sediment in Tairāwhiti and Wairoa districts was completed in May 2023.

Infrastructure assets in this sector are primarily land, but there is also conservation fencing, access tracks and vegetation. LINZ is responsible for some river and lakebeds as well as land, with total Crown-owned land approaching \$1 billion, including the Treaty of Waitangi landbank for iwi settlements and the Wairakei Forest. DoC has approximately \$7.8 billion of Crown-owned land (mostly national parks), as well as \$18 million of departmental land. Crown land is estimated at close to 15% of the total land in New Zealand.

Sector players

MfE is responsible for key legislation and regulations on land use, such as the RMA, National Environmental Standards and National Policy Statements and planning standards relating to land use. The RMA and Policy statements have a significant impact on the location, costs, and conditions to provide infrastructure. The National Environment Standard for Plantation Forests was jointly developed by the Ministry for Primary Industries (MPI) and MfE.

Toitū Te Whenua (LINZ) is responsible for land registry services and manages Crown-owned property. **DoC** has stewardship of national parks and other land for conservation purposes. **Te Arawhiti** is the Office for Māori Crown Relations which has a role in Treaty of Waitangi land settlements.

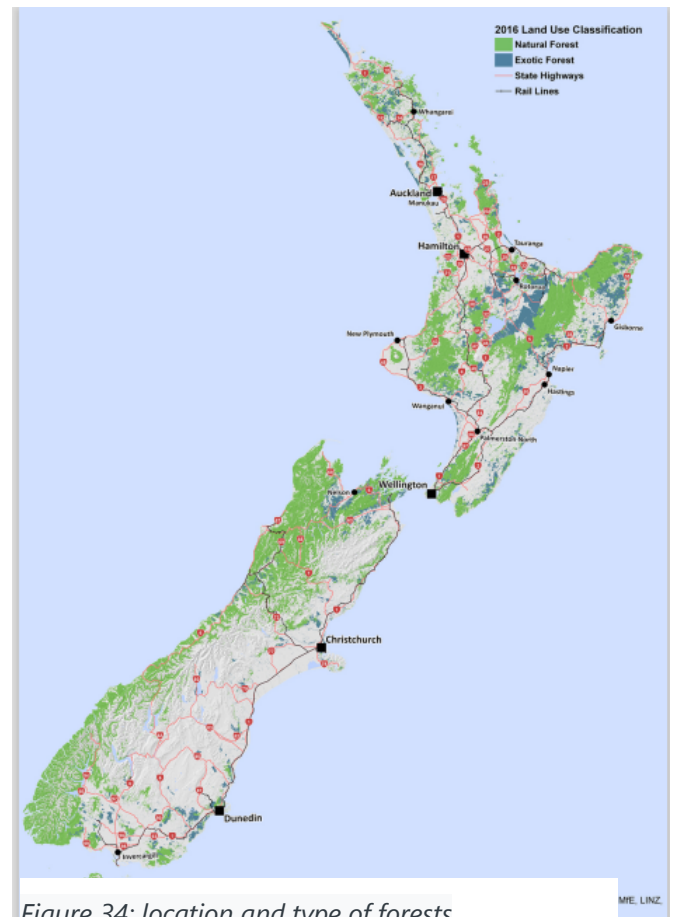


Figure 34: location and type of forests

²¹ [New Zealand's forests | NZ Government \(mpi.govt.nz\)](https://www.mpi.govt.nz/news-and-insights/articles/new-zealands-forests/)

Te Uru Rākau, New Zealand Forest Service (part of MPI), seeks to make the most of forests' contribution to wellbeing in New Zealand. This includes Crown Forestry, a commercial trading organisation that manages the Crown's commercial forestry assets (55 forests with 30,000 hectares planted).

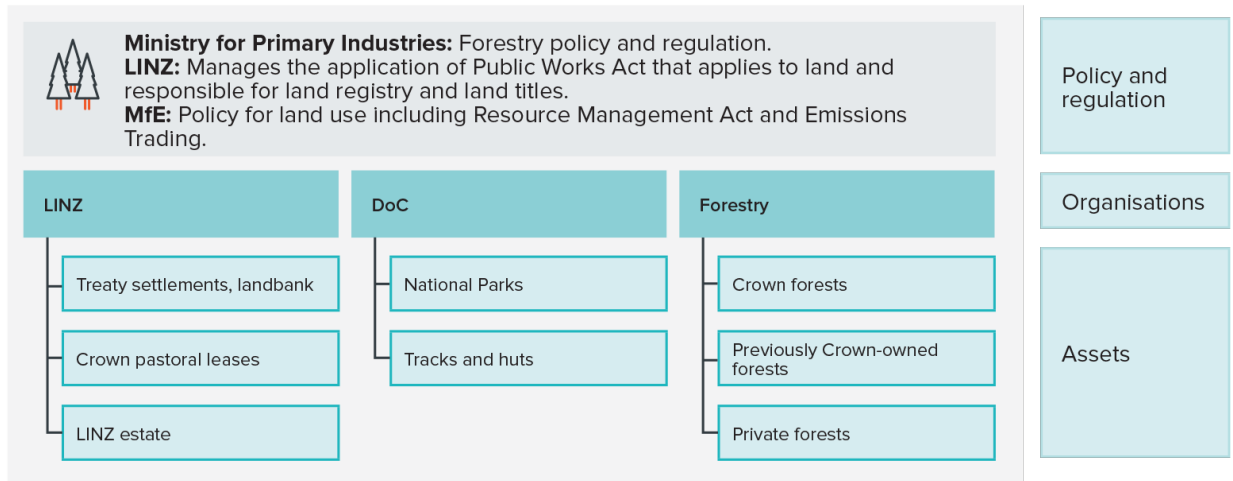


Figure 35: Sector players, Land, and forestry

Infrastructure asset performance

There is limited performance accountability or standards in relation to land use. MfE does categorise and map land use²² for operation of the Emissions Trading Scheme (ETS). It is possible to define the condition of conservation land and general land, including the prevalence of introduced flora and fauna. General land could also be graded in terms of soil productivity, terrain, flora coverage, erosion susceptibility etc.

DoC has identified asset performance measures and has reported on these since 2017/18; however, the measures are narrow in range and there are no targets set. For land use, the measures are based on pest and weed control. LINZ has some output performance measures related to Crown Property, but these don't cover the performance or condition of the underlying assets and are more financial or activity based, such as percentage of pastoral leases inspected.

Forestry performance²³ is reported on, in terms of economic returns, productivity and volumes. No data on the underlying land condition was found. There is an erosion susceptibility classification to set regulatory thresholds under the National Environment Standard for Plantation Forests. Councils are responsible for compliance monitoring of the National Environmental Standard, but there doesn't seem to be a requirement for any reporting by operators, councils or MPI.

Woody debris and sediment caused destructive debris flows and resulted in widespread damage to properties, infrastructure, and ecosystems. (page 10, Ministerial Inquiry).

²² [New Zealand land use map | Ministry for the Environment](#)

²³ [FGT 4234 Facts and Figures 2021 22 Internals FA web updated 1feb2023.pdf \(nzfoa.org.nz\)](#)

Sector challenges

- There is a limited understanding of the use and quality standards of Crown land.
- There is some overlap and inconsistencies between central, local, and regional government such as for waterways for example.
- There is limited transparency of the Crown land holding and possible economic use, for example as carbon offsets.

Land and forestry asset management drivers

Legislation and regulation

The Forestry Act 1949 and RMA is supplemented by the National Environment Standard for Plantation Forests.

Asset management requirements are under the Cabinet Office Circular CO(23)9 Investment Management and Asset Performance in the State Services.

Industry guidance

There is limited guidance from a frameworks perspective and there is limited oversight and accountability for land condition relating to Crown land, as agencies are responsible for both the policy and management of land.

Land and forestry asset management maturity

DoC was subject to the Investor Confidence rating as a capital-intensive agency, but LINZ and MfE were not. LINZ did have a performance standard to develop AMPs, and these have been completed, but are still relatively immature with limited data about the Crown landholdings. There is limited publicly available data on private forestry asset and land management. An overall summary of sector maturity is presented in Table 22.

Asset management function	Maturity	Overview of current practice
Strategic direction	Core	Strategy and objectives are either informal or documented as part of an asset management framework. In government agencies asset management policies and strategy may not be embedded to impact on decision making.
Levels of service	Basic	Customer groups are generally defined along with purpose statements. Some performance measures are in place.
Demand	Basic	Demand is not generally well-linked to land requirements. DoC does make a link between overall tourist numbers and national park visitors, but pro-active planning based on changes in demand does not seem to occur. Forestry does report on supply chain and export markets for products.
Evidence	Basic	There are some asset performance measures in place but there is no asset data based on levels of service. Limited land condition frameworks and/or condition data.
Risk	Core	Health and Safety at Work Act is embedded and led to risk management practices more generally.
Operational planning	Core	Operational plans are in place at varying degrees.
Capital planning	Core	Project management methodologies are used, and capital plans are in place. Capital funding may not reflect long-term sustainable levels of service.

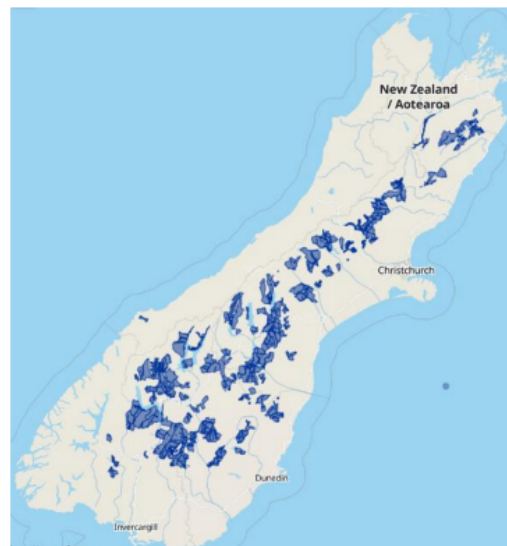


Figure 36: Crown pastoral leases

Asset management function	Maturity	Overview of current practice
Financial forecasts	Core	Assets are valued at market for land or depreciated replacement cost. Financial forecasts are in place, but funding strategies may not be aligned given there are limited asset levels of service.
Asset management plans	Core	AMPs are generally in place but do not fully cover all the infrastructure assets and sometimes lack depth of analysis.
People	Core	Operational asset managers are in place but often act in silos with little overarching governance in place.
Service delivery	Core	Mostly outsourced providers with KPIs and contract management in place and in-line with commercial or government rules of sourcing.
System and improvement	Core	Asset management maturity has been assessed at various levels although improvement activities are limited by resources.

Table 22: Asset management maturity, Land and forestry

Land and forestry funding

Crown land is almost all Crown-funded. Land is not depreciated so central government agencies may not be appropriately funded for land upkeep, such as noxious weed removal, erosion control and appropriate fencing and access ways.

Forestry plantations are mostly owned by the private sector and land ownership is often separated from the forestry operator that leases the land.

Recommendations for land and forestry

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to other sectors: Land and forestry
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	Medium relevance: There is no central government system lead for asset management. The Ministry for Primary Industries oversees guidance and regulation for forestry.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Unlikely to be required as not likely to be Major Infrastructure Providers.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	Medium relevance: Unlikely required as not likely to be Major Infrastructure Providers
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should	Medium relevance: Some consistent land and land-use condition framework and measures would be useful.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to other sectors: Land and forestry
	meet this requirement especially where they are providing critical infrastructure.	
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: It is unclear whether AMPs are in place. Some smaller private-owned forests should have more focused sustainable management plans that include removal of slash and land-use post-forest felling.
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Bare land, waterways, national parks, and forests may benefit from incentives to prioritise resilience. Clear-felled forests have caused downstream damage in extreme weather.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction co-ordination.

The specific recommendations for land and forestry are:

- Develop wider land condition frameworks to complement the erosion susceptibility classification and review the classification to ensure it is fit for purpose.

Development of consistent land condition frameworks would be useful for bare land use and complement national environmental standards. The Ministerial inquiry on land use recommended a higher-level erosion classification that would limit land use to perpetual native forests.
- Ensure there is appropriate scrutiny of asset management and infrastructure performance across Crown land.

There are significant parts of New Zealand in Crown-ownership that may not be achieving its highest and best use, including as long-term thriving eco-systems.
- Consider if there should be any publicly available reporting on the impacts of forestry harvesting to the underlying land and neighbouring land uses.

Clear-fell harvesting may be the most cost-effective method for harvesting but the short, medium and long-term impacts to the land and communities may not be transparently measured.

Land and forestry reference documents

- Cabinet Office Circular CO(23)9²⁴ *Investment Management and Asset Performance*
- Ministry for the Environment: [Ministerial Inquiry into Land Use](#)
- Department of Conservation: [Pūrongo-ā-tau – Annual Report 2021](#)
- Land Information New Zealand: [Annual report 2021/22.](#)

23. Other sectors: Justice

Justice sector overview

The Justice sector comprises New Zealand Police, Corrections, and the Ministry of Justice (MoJ). Each of these Government agencies has significant building stock that enable the provision of justice services. Total justice sector assets, including ICT, are approximately \$7 billion.

Police has over 16,000 staff across 331 stations across 12 districts, along with specialised police equipment, fleet (over 4,000 vehicles), and ICT. Property, plant, and equipment was valued at \$1.541 billion²⁵ with land and buildings \$0.833 billion of that total.

Corrections employs over 9,000 staff, the majority of whom work in one of 18 prisons and 194 Service Centres. Land and buildings for Corrections are valued at \$3.548 billion²⁶ and total property, plant and equipment (including fleet, plant and equipment furniture and fittings) is \$4.555 billion.

MoJ administers the court system, the legal aid system, and the Public Defence Service. It has more than 4,500 people who work in 120 locations around the country, delivering justice services. The MoJ owns approximately 70 Court houses, and the Ministry's total property plant, and equipment has a net book value of \$1.331 billion²⁷.

²⁴ <https://dpmc.govt.nz/publications/co-19-6-investment-management-and-asset-performance-state-services#:~:text=CO%20%2819%29%206%3A%20Investment%20Management%20and,Asset%20Performance%20in%20the%20State%20Services>

²⁵ <https://www.police.govt.nz/sites/default/files/publications/annual-report-2021-2022.pdf> note 10, page 95

²⁶ [Annual Report 2021/2022 | Department of Corrections](#), note 8, page 146

²⁷ [Ministry-of-Justice-Annual-Report-2021-22.pdf](#) page 114

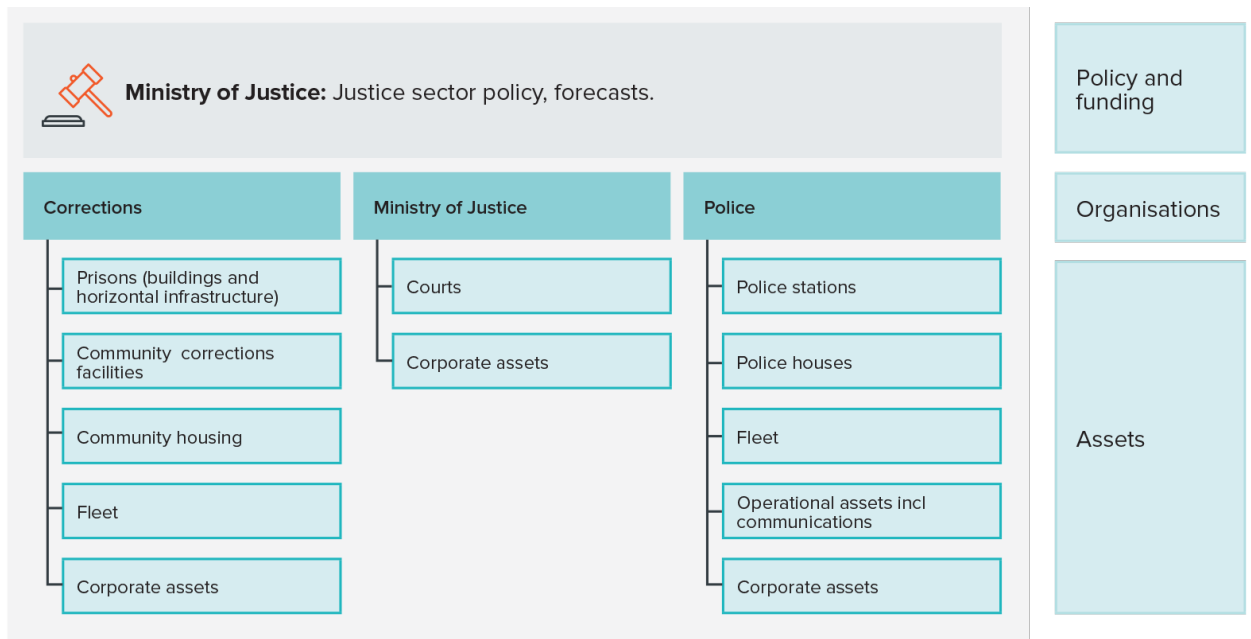


Figure 37: Sector players, Justice

Sector players

MoJ undertake policy advice, including justice legislation. MoJ also leads a “justice cluster” approach including responsibility for research and data across the sector.

Infrastructure asset performance

Corrections identified that 81% of prison buildings and 94% of community corrections facilities are in excellent or good condition, and prison service utilisation was at 99% in 2021/22²⁸. The building condition measure for Justice is based on comparison to a baseline rating, but doesn’t provide an overall measure. Police identified that 95% of operational properties have a building condition rating, but don’t identify what the condition rating is.

The Treasury completed a spending review on the Justice cluster²⁹ that identified “Aging infrastructure assets and assets not fit for purpose in each of the agencies will require careful prioritisation and investment decisions to ensure critical assets are maintained and are available to enable organisation and justice cluster strategies to be implemented. This includes optimisation of prison networks and better utilisation of court assets. This may require investment to get fit for purpose assets and future benefits and divestment of underutilised assets across all agencies.”

Sector challenges

The sector is influenced by prevailing economic and societal factors. Crime victimisation has been increasing as a trend since 2014. The ability to plan long-term using accurate service forecasts was identified by asset managers as a challenge. The infrastructure planning horizon is generally longer than the operational forecasts and planning present in the Justice sector.

Justice service demand forecasting is undertaken by the MoJ and used by the other agencies. The actions of an agency in this sector have implications on demand for the other agencies, with a pipeline from Police to Courts to Corrections. Policy settings have a major impact on assets in the sector, don’t

²⁸ [Annual Report 2021/2022 | Department of Corrections](#), page 183

²⁹ [Treasury Report T2021/3094: Justice Cluster Spending Review Final Report - 17 February 2022 - Budget 2022 Information Release](#), page 19

always align with long-term infrastructure planning timeframes, and have led to short term operational responses. For example, the number of prison inmates peaked at close to 10,500 in 2018, and was closer to 7,500 in September 2022. In addition, service forecasting has often not correctly predicted peaks in demand, leading to reactive solutions such as double bunking.

Asset management may not have a significant enough role, and there is a lack of understanding of the importance of assets in delivery of key services, which makes it difficult to express risk and investment requirements and priorities to decision makers.

Justice sector asset management drivers

Legislation and regulation

Asset management requirements were under the Cabinet Office Circular CO(19)6 Investment Management and Asset Performance in the State Services, and this has now been replaced by CO(23)9. The requirements for asset management are similar, however the ICR has now been replaced by the requirement for an attestation from Chief Executives that requirements in CO(23)9 are being met. There is also additional focus on resilience and risk of critical service assets. Justice sector agencies are also subject to a range of legislation and regulation including building compliance under the Building Act 2004. Legislative requirements such as health and safety considerations, and seismic assessment are driving some better asset management practices. Custody facilities are subject to OPCAT³⁰ visits by the Ombudsman.

Industry guidance

Some organisations in the sector more closely follow asset management industry body guidance such as the Āpōpō Guide, and all are subject to CO(23)9. A justice sector infrastructure group was established in late 2022 to share practice and communicate across agencies.

Justice sector asset management maturity

Each of the three agencies has been part of the Treasury's ICR process to assess asset management maturity. The sector was at an "intermediate" level of asset management maturity in the assessment completed in 2019.

The appropriate level of maturity was at an advanced level for two of the agencies and high intermediate for the other. All three agencies recognise that the gap between actual and desired maturity is larger than previously reported in the ICR, and they are embarking on improvement programmes. The agencies are taking a more holistic view of asset management, but there is a gap between the targeted and current asset management practice.

In 2022, Corrections revised their current asset management maturity to a significantly lower "core" level than was identified in the ICR. Since then, Corrections has made significant progress developing a Strategic AMP, Water National Infrastructure Plan, Asset Data and Information Strategy, as well as establishing asset levels of service and performance measures across some asset portfolios. Corrections are progressing towards their three-year target to "intermediate" asset management maturity.

MoJ and Police are further behind given they have much smaller asset management teams than Corrections. Both are more likely to be at aware/basic levels for most asset management elements.

³⁰ The [Optional Protocol to the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment \(OPCAT\)](#)[\(external link\)](#) seeks to prevent torture and other forms of ill-treatment through the establishment of a system of regular visits to places of detention carried out by independent international and national bodies.

Infrastructure asset management is primarily focused on the building stock for all three agencies, which have differing requirements. The opportunity for co-location benefits/planning is not always fully realised among the agencies to achieve better justice sector services.

Most effort is currently on reactive maintenance, with MoJ embarking on a condition assessment of existing assets. There are limited foundational frameworks and a lack of a clear line of sight between the quality and functionality of buildings, and organisational strategies and objectives. The Strategic AMP by Corrections is a good example could be leveraged by others in the sector.

An overall summary of sector maturity is presented in Table 23.

Asset management function	Maturity	Overview of current practice
Strategic direction	Basic	Strategic analysis occurs as part of the development of Statements of Intent and high-level organisational strategies, but asset management is not always well represented in strategic decision making. Asset management policies are in place in the three agencies. Corrections has developed a Strategic AMP and Police have developed an asset management work programme and an Asset Management Roadmap (asset management strategy) is in progress.
Levels of Service	Basic	Levels of service are generally not well understood, not do they drive decision making. Most measures are technical, with few high-level performance measures. There is not full coverage of asset levels of service. Corrections now has levels of service and performance frameworks in place for some asset portfolios.
Demand	Basic	Demand forecasting is undertaken by MoJ and used by the other agencies. Demand management strategies are generally developed but evidence of their implementation is not clear. Demand and service change forecasting and planning not accurate, aligned or at level able to be used for infrastructure planning.
Evidence	Core	There are no common asset management systems or standardisation of asset data conventions across the agencies. Condition assessment programmes are mostly in place for agency assets, but there is little collection of other performance data. Corrections has a draft asset data and information strategy.
Risk	Core	The justice sector is naturally risk averse and reactive. Agencies may have good risk management practices in place. Asset criticality frameworks are developed or in development, but ratings are often not populated in the asset register or formally used in operations and maintenance and renewal prioritisation.
Operational planning	Core	Operational decisions such as quantity/type of planned maintenance and maintenance intervention strategies are usually made based on staff knowledge combined with available condition and performance data.
Capital planning	Core	Renewal forecasts for AMPs are limited and do not influence long-term capital planning. Capital budgets are not split into growth/level of service or renewal, and depreciation is not ringfenced. The result is that the existing stock of assets are deteriorating with insufficient renewal investment. Generally poor-quality assets that haven't had investment for an extended time.
Financial forecasts	Core	Financial planning is relatively short term. Investment focusses on portfolio and project delivery without robust asset renewal forecasts.
Asset management plans	Core	Although CO(19)6 required LTPs and AMPs to be produced, there was little enforcement. Agencies have AMPs, but they have not been well embedded in the organisations or used for strategic decision making. Development of more focused AMPs are underway.
People	Core	Capability and capacity are a significant issue, as for most other sectors. Lack of strong leadership and role definition are often contributors to poorly executed asset management improvement plans, and the need for strong cross-organisational coordination of asset management functions. Asset management is often not well represented at senior leadership.
Service delivery	Core	MoJ and Corrections utilise a syndicated contract for outsourced facilities management that includes asset management services. Police have retendered facilities management and sought an "asset-led" contract.
System and improvement	Basic	Process documentation and quality management is poorly managed. This has become an increasingly important issue as staffing 'churn' increases as knowledge and processes are lost when key staff leave. All these agencies have been through the ICR process, and the asset management practices have benefitted from the spotlight that has been shone on them in the past although acknowledge that the asset management maturity ratings over-stated the current practice.

Table 23: Asset management maturity, Justice sector

Justice sector funding

The Justice sector is almost exclusively funded by the Crown. It is difficult for the Justice sector to compete for funding against sectors such as Health and Education as the evidence-base for

infrastructure investment is weak. High profile media reports of crises, such as the insufficient number of spaces for inmates during the 2015 period, and courtroom incidences, prompt reactionary investment.

The level of Crown funding for infrastructure renewal through depreciation is insufficient. Police buildings are not valued as specialised buildings and may be significantly under-valued resulting in less depreciation and a deteriorating property portfolio. The current significant building inflation will mean that funding based on the depreciation of existing assets will generate a more significant funding gap in future. Depreciation funding is not ring-fenced, so for example building infrastructure depreciation is often used to fund digital asset purchases or operational activities. There is some evidence of maintenance funding is being reduced to only cover very high priority reactive maintenance and limited proactive maintenance.

Additional service needs to support tribunal resolution, provide wrap-around prisoner support, and policing responses to increased crime have put greater pressure on agencies to rapidly respond, and have diverted funding away from the core infrastructure stock. There are more expectations from staff on the quality of the buildings and much more focus/interest on sustainability issues relating to infrastructure that agencies have limited ability to deliver.

Recommendations for Justice

The following table describes how the key recommendations relate to this sector:

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to other sectors: Justice
Governance	Key Recommendation 1: Strengthen infrastructure asset management requirements and their oversight and enforcement by the relevant system lead.	High relevance: There is no central government system lead for asset management.
	Key Recommendation 2: Require all public MIPS* to have an identified and accountable governance body and/or executive lead for asset management. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Given the criticality, size, and complexity of Justice assets these needs to be supported through governance and leads at each agency.
Transparency	Key Recommendation 3: Require all public MIPS to periodically undertake an independently verified asset management maturity assessment and publicly report on the results. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: Since ICR has been dis-established there is no assessment of asset management maturity and no transparency on practice.
	Key Recommendation 4: Require all public MIPS to publicly disclose a consistent set of asset performance measures, subject to external audit or scrutiny. Other MIPS should meet this requirement especially where they are providing critical infrastructure.	High relevance: The consistent set should enable benchmarking and investment prioritisation over time.
	Key Recommendation 5: Require all public MIPS to publicly disclose a minimum core level, ten-year asset management plan, refreshed at least three-yearly, and subject to external audit or scrutiny. Other MIPS should meet this	High relevance: It is not clear if AMPs are in place.

	Key Recommendations (*MIPS = Major Infrastructure Providers)	Relevance to other sectors: Justice
	requirement especially where they are providing critical infrastructure.	
Resilience	Key Recommendation 6: All providers of critical infrastructure should be required to explicitly assess and appropriately prioritise infrastructure resilience through their asset management and renewals cycles in accordance with their strategic objectives. Other MIPS should be encouraged to meet this requirement.	High relevance: Resilience levels across justice sector infrastructure should be identified along with targets and corresponding investment plans.
Productivity	Key Recommendation 7: Invest in asset management training programmes and develop a clear training and professional pathway for asset managers.	High relevance: A high level of asset management competence is required in this sector and there is a shortage of suitably experienced asset managers.
	Key Recommendation 8: Improve co-ordination of regional planning across infrastructure sectors, so that future demand requirements can be met.	High relevance: Improved, coordinated spatial planning is a key part of good asset management planning (right asset, right place, right time), and needs cross-jurisdiction coordination.

The specific recommendations for the Justice sector are:

1. Review processes for forecasting demand to include a focus on data to support long-term infrastructure planning for the whole sector.
The current demand forecasts are short-term in focus and don't include the whole Justice pipeline.
2. Ensure there is an appropriate capital investment model and funding for Justice infrastructure services at a programme level, with a clear long-term investment pipeline and a focus on asset renewals.
The current depreciation funding model is likely to be insufficient and lead to further asset deterioration. This was also identified in the Treasury Justice Sector spending review. The recent CO(23)9 circular provides more guidance on depreciation including paragraph 31 that depreciation must be applied to assets.
3. Improve coordination and sharing of asset management practices across the Justice sector and with the wider Government sector, (this could also include leveraging asset management systems and data structures across the Justice cluster), including potentially common asset performance measures and asset management frameworks.
There is an opportunity to leverage the asset management resources and expertise across the Justice sector to produce better outcomes across the whole sector.
4. Improve end-to-end governance of asset management as in Key Recommendation 2 and align to investment management, funding models, and long-term investment pipeline.
Asset management should be featured more in Executive governance to achieve stewardship objectives and ensure long-term sustainable assets enable Justice services.

Justice reference documents

- Cabinet Office Circular CO(23)9

- *Treasury Report T2021/3094: Justice Cluster Spending Review Final Report - 17 February 2022 - Budget 2022 Information Release*
- *Annual report 2021/2022 Department of Corrections*
- *Annual report 2021/2022 Ministry of Justice*
- *Annual report 2021/2022 Police.*

ENDS