



Auckland Water Strategy Supplementary Document

Why Water Infrastructure Should be Mauri-enhancing

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TEKTUS
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Introduction

This report has been prepared by Tektus Consultants and Auckland Council, as a part of the development of the Auckland Water Strategy (the Water Strategy). This report is one of three documents published to increase understanding about how infrastructure can respond to the vision of the Water Strategy (Te Mauri o te wai o Tāmaki Makaurau, the life-sustaining capacity of Auckland’s water, is protected and enhanced). These three documents help us to understand how and why we would build mauri-enhancing infrastructure. The three documents are:

1. **Why Water Infrastructure Should be Mauri-enhancing (this document)**
2. Mauri-enhancing Infrastructure Case Studies
3. Assessing the Mauri of Infrastructure and Water.

Purpose

The purpose of this document is to make the case for developing infrastructure that is resilient, conspicuous, and mauri-enhancing. It provides evidence that regenerative, conspicuous, and mauri-enhancing infrastructure is possible and can achieve positive outcomes for all – with strong alignment to the regenerative principles within water sensitive design.

This report responds to Shift 4 of the Water Strategy: *“Regenerative Infrastructure: Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders.”*

Refer to Figure 1 for Shift 4’s context within the Water Strategy Strategic Framework. For further details on the Water Strategy and its implementation, refer to the full Auckland Water Strategy document and the Water Strategy Implementation Plan 2022.

Water Strategy Strategic Framework		
Our Vision	Te mauri o te wai, the life-sustaining capacity of Auckland’s water, is protected and enhanced’	
Our Treaty Context	The Council and mana whenua must take a partnership approach to the protection, management and enhancement of water	
Our Over-arching Challenges	<ol style="list-style-type: none">1. Protecting and enhancing the health of waterbodies and their ecosystems2. Delivering 3-waters services at the right time, in the right place, at the right scale, as the city grows.3. Having enough water for people now and in the future4. Reducing exposure to water-related natural hazard risk over time.5. Affordability for Aucklanders6. Improving how the council works with its treaty partners7. Improving how the council organises itself	
Our Cross-cutting Themes	Equity and Affordability: Equitable access to essential services and affordable investment Climate Change: Mitigating and adapting to the impacts of climate change	
Our Strategic Shifts	1 Te Tiriti Partnership The council and mana whenua working together in agreed ways on agreed things	2 Empowered Aucklanders Working with Aucklanders for better water outcomes
	3 Sustainable Allocation and Equitable Access Prioritising mauri when using water, to sustain the environment and people in the long term	4 Regenerative Water Infrastructure Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders
	5 Water Security Water abundance and security for growing population through efficient use and diverse sources	6 Integrated Land Use and Water Planning Integrating land use and water planning at a regional, catchment and site scale
	7 Restoring and Enhancing Water Ecosystems Catchment-based approaches to the health of water ecosystems	8 Pooling Knowledge Shared understanding enabling better decisions for our water future
Our Implementation	Co-ordination, Capacity and Capability across the Council Group	

Figure 1: Auckland Water Strategy Strategic Framework

Tāmaki Makaurau context

Historic context

Ka mua, ka muri – ‘walking backwards into the future’ is a whakataukī (Māori proverb) that highlights the importance of using the past to inform our future. This section presents a brief overview of the mauri of water within Tāmaki Makaurau which has been degraded over time due to historical approaches taken to infrastructure design and delivery.

The legacy of Māori loss – land, language, tikanga, and mātauranga, compounded by inequity and development paradigms have fundamentally altered the landscape without cognisance of the whakapapa (genealogical links) between tangata, whenua, and taiao (people, land and environment). This history must be acknowledged in how we respond to and protect and enhance water in Tāmaki Makaurau moving forward.

Tāmaki Makaurau was first settled by Māori who became known as tangata whenua, meaning ‘people of the land’. The expression illustrates the profound relationship Māori have with the land and the environment. Māori view both themselves and the natural world as one, connected through whakapapa. More than a physical connection to the land, it is essential to understand the spiritual association with the land. That all living things within the environment, including people, are inseparably interconnected and interdependent. In current times this relationship is represented through nineteen mana whenua groups across the Auckland region.

Beginning in the 19th century, urbanisation and densification of Auckland occurred via a colonial land development and infrastructure paradigm, founded on drainage and underground infrastructure. In many ways these infrastructure solutions were beneficial to public health but are in conflict with environmental and cultural outcomes and over time actively diminished te mauri o te wai.

The first piped water supply from Auckland Domain was completed in 1869. In the language of the [Water Sensitive Cities Index \(WSC\)](#), this reflects Auckland’s transition from living with the land, into a ‘water supply city’ (WSC vernacular). Auckland was responding to population growth and urban development following colonial design paradigms. There are several examples of this approach:

The Waihorotiu stream originally ran along the Queen Street gully – approximately present-day Queen Street. Liquid and solid waste was disposed of directly into the stream and as such the pressures of population growth in the Waihorotiu catchment meant the stream became fouled. The stream was referred to as the Ligar Canal and was lined straightened and contained. Eventually the canal was bricked over in the form of a sewer that ran to the Waitematā Harbour. In time the sewer was piped to the Ōkahu treatment plant.

Ōkahu Bay is significant to Ngāti Whātua o Ōrākei, providing papakāinga, landings, fishing grounds, and urupā. In 1914 the wastewater from Auckland Central was piped to discharge at the head of Ōkahu Bay. This continued until 1960 when wastewater flows were diverted to a newly constructed Māngere Wastewater Treatment Plant and discharged to the Manukau Harbour. The discharge of untreated wastewater, including hospital waste, into Ōkahu Bay caused a range of health issues. The bay was unsuitable for bathing, kaimoana was unsafe to eat, and the constructed pipe blocked flows from the upper catchment turning the village into swampy ground in rains, significantly degrading the mauri of the bay. The pipe formed a physical barrier severing peoples’ connection – both physical and spiritual – to the moana and kai basket of Ngāti Whātua o Ōrākei, contributing to diminishing mauri of the area and of the people. The sewage pipe is now hidden under Tāmaki Drive and during large rain events

provides a wastewater overflow into Ōkahu bay. Although separation works are now underway, to this day the bay remains affected and is representative of other parts of Tāmaki Makaurau.

Ihumātao is another example where colonial water management methods failed to recognise and provide protection for te mauri o te wai. Māngere lagoon and Oruarangi Creek are significant to Te Wai-o-Hua iwi and the tangata whenua of Makaurau Marae. Oruarangi and Waitamakoā Creeks were dammed in the 1960s for the construction of the Māngere Wastewater Treatment Plant. The people lost access to the harbour and the whole of their traditional seafood resource. As a result, the estuarine environment turned into a freshwater environment and the customary resources from the stream were lost. In 2004, the dam separating Oruarangi creek and Mangere Lagoon was removed, reconnecting people and water to ancestral fishing and kaimoana grounds and returning the area to its previous estuarine state.

The waterway characteristics of Tāmaki Makaurau have changed considerably over the last 200 years. Wastewater and stormwater flows are now piped within catchments, modified shorelines and stream alignments, and there are many piped streams across Auckland. Reliance on subsurface pipe networks to manage water has disconnected people from the environment. Hidden and unknown services has contributed to a perception of water in the urban area as a nuisance and waste rather than as a tūpuna, taonga, and resource. Similarly, a centralised water supply network – while bringing advances in sanitation and security of supply in urban centres – has disconnected people from their water supply.

The development of water systems in Tāmaki Makaurau has disregarded Māori principles and values. Systems reflect the colonial development paradigm and are devoid of the cultural input unique to Aotearoa. The lack of consideration for the receiving environment and cultural values has resulted in contamination of surrounding water bodies, breakdown of ecosystems, and degradation of the land, in direct contradiction of Māori values and to the detriment of mauri.

Current state

The term ‘water infrastructure’ traditionally conjures images of ‘grey infrastructure’: concrete or plastic systems - hydraulically efficient, connected, and often centralised pipe networks for three types of water associated with infrastructure (stormwater, wastewater, and water supply). These networks are typically designed to Codes of Practice, or follow similar rules-based frameworks. As a result, they are inherently rigid systems that are now demonstrating a lack of resilience.

Changing climate, increasing sea levels, increasing rainfall and drought intensity, population growth and urban intensification, is reducing the ability for our current water management systems to be resilient for the future.. Auckland’s water management systems were built to serve a smaller scale of population and were designed to function under previous climatic conditions (which were presumed stable). Climate change and population growth have altered the conditions in which these systems need to function. In many instances water systems have not been built to be resilient enough to respond to future uncertainty – there is no space or flexibility in the systems for resiliency during extreme events which are becoming more common occurrences due to our changing climate.

For example, a stormwater network built in Manukau City, before 2010, was designed to convey flows up to a once-in-5-yr-rainfall event and placed emphasis on provision for overland flows to enable the area to withstand events exceeding this threshold. Codes of Practice have been revised to reflect changing conditions and now the design ‘level of service’ is for a once-in-10-yr-rainfall event. The original network no longer complies, and poses a higher risk from flooding events for that community relative to other areas.

In summary, Tāmaki Makaurau water is:

- Enclosed in out-of-sight and unknown (buried) water infrastructure. This has led to Aucklanders being disconnected from knowing where water comes from or goes to
- as a function of the above design solutions, it is non-conspicuous. This has the effect that people are not empowered to know about or manage their own water security if they wanted to.
- managed via centralised water infrastructure systems, often making it more cost-efficient but also making it more vulnerable to failure
- considered in silos, with water infrastructure being managed separately, or disjointed from, our natural waterways without recognising the connected hydrological cycle, and likely impacts on receiving environments
- managed via developer-led system designs, which often follow a rules-based, ‘minimum-standards’ approach to water system design
- managed through infrastructure-based solutions that rely on centralised systems, pipe networks, and single-function devices to maximise development yield
- not managed in a way that provides opportunities for mana whenua to be active kaitiaki, nor active decision-makers in the way we currently manage water.

Future state: Te mauri o te wai

Vision: Te mauri o te wai, the life-sustaining capacity of Auckland's water, is protected and enhanced.

Te mauri o te wai is a holistic concept founded on the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of people and the wider environment. Conceptualising water this way is consistent with [Te Tiriti o Waitangi](#), and statutory obligations including the [Resource Management Act](#) (and [current draft Natural And Built Environments Bill](#)), [National Policy Statement on Freshwater Management](#), [He Kahui Wai Māori](#) (the advisory group for the Ministry for the Environment essential freshwater programme), [Three Waters reform](#) (including the [Water Services Bill](#)), as well as the [Waikato River \(2010\)](#) and [Te Awa Tupua \(2017\)](#) Acts.

Locally, te mauri o te wai is a concept that accords with Aucklanders' and Auckland Council Group's values and has been adopted through the [Our Water Future discussion document](#) as the vision to guide the Water Strategy. The Auckland Plan 2050 also directs Council to "Apply a Māori worldview to treasure and protect our natural environment (taonga tuku iho)", and te mauri o te wai aligns with te mana o te wai in the National Policy Statement – Freshwater Management 2020. The vision of the Water Strategy places te mauri o te wai at the centre of water management. The vision has been embedded in all of the strategic shifts in the strategy and is the foundation for all of the actions proposed in the strategy. This can be seen in the Water Strategy's Strategic Framework (Figure 1).

Mauri – the life-sustaining capacity – of water is a fundamentally intuitive concept. There is a qualitative difference we feel when walking alongside a healthy waterbody compared to one that has been channelled, polluted, or piped. The vision outlines a future where the region's waters are healthy, thriving, and treasured. A future where the deep connections between water, the environment and people are recognised and valued. The vision recognises the mana whenua as kaitiaki within the region and represents values that can unify us in our actions.

In relation to infrastructure, protecting and enhancing te mauri o te wai requires mana whenua and Auckland Council to be partners in understanding mauri in all aspects of water management. Due to the foundational nature of mauri as a concept (i.e. life sustaining), the mauri of water should be the first consideration in decision making, and mauri should be the primary measure of success. Through the Water Strategy, council has committed to use its significant role in designing, consenting, delivering, and managing infrastructure to enhance mauri and ensure natural ecosystems are protected, restored, and enhanced.

What does regenerative, resilient, conspicuous, and mauri-enhancing mean?

The terms 'regenerative,' 'resilient,' 'conspicuous' and 'mauri-enhancing' are used in the Water Strategy. These are used to mean:

Regenerative infrastructure is an approach to water management that protects, restores, or mimics the natural water cycle. Regenerative design uses 'system' or 'circular' thinking to work with natural systems, reducing the need for new infrastructure and seeking to redefine waste as a resource (creating a 'circle'). Sustainability concepts such as integrating renewable energy are also important. Regenerative infrastructure includes nature-based solutions, where we are investing in solutions that regenerate natural systems.

Resilient infrastructure is designed to withstand and adapt to changing conditions. Regenerative infrastructure should also support communities to recover from those shocks and stresses.

Conspicuous infrastructure is visible and easy to understand. This helps people to understand their infrastructure, the impact they have on the environment and empowers them to act responsibly. The idea is that if a stream or wastewater discharge is visible to people, they will understand it and act to improve it rather than potentially exacerbate the negative effect. Auckland's reliance on subsurface pipe networks to manage our three infrastructure waters has created the current disconnect from our waterways with non-transparent and unknown servicing – disconnected from people and environment, cementing a perception of waste and disposal rather than connection and value as tūpuna, taonga, and resource.

Mauri is the life force, the essential quality and vitality of a being or entity. For infrastructure to increase the mauri of water it needs to have the intrinsic health and wellbeing of water at the core of any infrastructure decisions for all stages of the water cycle.

What do we need to do to achieve the vision of mauri-enhancing infrastructure?

Achieving the Water Strategy's vision of te mauri o te wai requires a shift from current perceptions of water as a resource to one where wai is actively treasured as a taonga, and mauri is enhanced. This will require using and returning water to the environment differently, observing and listening to water in all its forms, partnerships with mana whenua, enabling Māori outcomes and community participation.

To achieve this vision, Council has committed in the Water Strategy to building infrastructure that increases the mauri of water¹. However, it is essential to acknowledge that te mauri o te wai is influenced at a catchment-wide scale, mai uta ki tai (from inland to the sea). As such, it requires responses – and step change – across all the ways that the council affects water outcomes (captured in each of the strategic shifts of the Water Strategy).

The Water Strategy recognises that infrastructure decisions and design solutions are strongly related to decisions around land use and the perceptions and values of our communities. As such, our future solutions will move away from traditional infrastructure responses, in order to enable us to enhance mauri and respond to pressures including; population growth, densification, climate change and equitable communities. Furthermore, our future solutions need to consider reducing greenhouse gas emissions, reducing embodied and operational carbon, seek opportunities for active sequestration of carbon which cannot be avoided through design, and respond to and plan for the effects that climate change will impose on our infrastructure.

The Water Strategy has committed the council group to ensuring our infrastructure is resilient, conspicuous, and mauri-enhancing. For this to happen an approach based on water sensitive cities and mātauranga Māori needs to be understood and valued by all. Water needs to be valued through all water states and through design and implementation. The premise is that if infrastructure is built in a way that people can connect with water, they become conscious about their use and impact, which will improve collective social connection to wai, and provide support measures that protect and enhance mauri.

Auckland can draw on the experience of international peers, informed by the work of the [Cooperative Research Centre for Water Sensitive Cities](#) and Auckland's commitment to embody a water sensitive city in the Water Strategy. However, that commitment needs to be applied locally, cognisant of our obligations as partners through Te Tiriti o Waitangi, and empathetic to the roles and responsibilities of mana whenua – obligations to tūpuna and mokopuna, in harmony with te taiao. Through whakapapa, the genealogical connection to te taiao, rights and obligations are conferred on mana whenua establishing them as kaitiaki (guardians or stewards) for the environment.

[Te Ora ō Tāmaki Makaurau](#) is the wellbeing framework developed by the Tāmaki Makaurau Mana Whenua Forum in response to [Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan](#). By considering Te Ora ō Tāmaki Makaurau, council can connect regenerative, conspicuous, and mauri-enhancing infrastructure across the council group. In addition to the Water Strategy, focusing on te mauri o te wai, there are strategies across the council that will affect infrastructure and the environment, and help guide decision-makers in selecting the option most suitable for enhancing mauri, in respect of water and infrastructure.

Similarly, [Te Rautaki Ngahere ā-Tāone o Tāmaki Makaurau: Auckland's Urban Ngahere \(Forest\) Strategy](#) provides a valuable partner strategy to enhance the connection between tangata, whenua, and taiao – and ultimately enhance the mauri of our waters. Connected green-blue corridors – of sufficient width to provide

¹ The council will exclusively build infrastructure that enhances mauri from 2030-2050.

for self-sustaining riparian margins and with appropriate species diversity, in addition to water sensitive road corridors where our urban ngahere can flourish, will restore ecological connection across Tāmaki Makaurau and support healthy and resilient communities. We will look to measure success in varied ways, for example, as the Urban Ngahere Strategy aspires: *“We might even hear the dawn chorus – e kō i te ata – once again within urban Auckland”*. We should seek means to assess the mauri of our waterways that respond to a connected system, for example by the presence, health, and abundance of our urban manu (birds), especially sentinel species appropriate to the catchment. Essentially, moving away from a reliance on inherently reductionist frameworks and practices of water management that consider our ‘three waters’ in isolation and dominate the current industry.

What does this mean for Auckland's infrastructure?

Mauri-enhancing infrastructure will recognise multi-functional and connected systems. A holistic approach to how we value, plan for, design, implement, maintain, decommission, and renew infrastructure will help create a healthy Tāmaki Makaurau for the land, the environment, and its people. A strong connection to nature has been demonstrated to support improved mental health, social cohesion, and physical behaviour within communities – linking healthy ecosystems to people's cultural, spiritual, and physical wellbeing.

Water sensitive design seeks outcomes of a holistic approach to land and water management, connection with ecosystems, community wellbeing, resilience, and intergenerational equity, all of which are embraced within te ao Māori. Alignment between non-indigenous science and mātauranga Māori, knowledge gained over generations of lived experience as part of nature, will only enhance our ability to provide mauri-enhancing solutions, that respond to urban liveability and recognise the competing space constraints in our urban centres. Water sensitive design seeks outcomes of a holistic approach to land and water management, connection with ecosystems, community wellbeing, resilience, and intergenerational equity, all of which are embraced within te ao Māori.

Resilient, conspicuous and mauri-enhancing infrastructure solutions represent and reflect the way nature intended these systems to function. Naturalising infrastructure solutions will help make infrastructure mauri-enhancing. Where built infrastructure is unavoidable due to the constraints imposed by existing urban form and liveability and safety needs, ensure networks work with nature and maximise the opportunities enabled by technology, innovation, and smart networks.

In Tāmaki Makaurau Auckland within council planning we aspire to:

- reimagine the term 'water infrastructure', beyond the narrow 'grey infrastructure' view
- change perception from 'water management' to applying holistic approaches that aim to enhance te mauri o te wai
- ensure that resilience is understood and valued in water infrastructure
- measure success through an outcomes-based framework that recognises broad catchment and community outcomes, and accounts for the true costs over the asset lifetime
- ensure that council leads the design of mauri-enhancing infrastructure at a catchment scale, and inspire developers and private redevelopment to respond
- prohibit actions and activities that degrade te mauri o te wai – in some instances, they may be allowed to proceed if actions are taken elsewhere in the same catchment to deliver a net improvement in te mauri o te wai
- ensure operational and maintenance financial budgets account for blue-green infrastructure and reflect the broader outcomes that these systems provide, while enabling active kaitiakitanga by mana whenua and tiakitanga by engaged community groups
- celebrate and connect with water throughout place-making processes
- enable mana whenua to fulfil leadership positions for co-design, co-management, and decision making in water.

In Tāmaki Makaurau Auckland council aspires to enable and build infrastructure:

- that only increases the mauri of water
- which utilises blue-green infrastructure and provides multifunctional solutions and contributes to wider wellbeing outcomes
- in a conspicuous way in which we can connect with and know about our use and impact
- that is carbon neutral or carbon positive
- that provides opportunities to maximise resource recovery through ongoing commitments for innovation and improvement
- that utilises water sensitive design methodologies beyond stormwater management alone
- that utilises technologies and smart infrastructure to enhance wellbeing
- which enables Auckland to reach a state where no runoff from hard surfaces enters our waterways without treatment or blue-green infrastructure interactions
- which enables Auckland to achieve a condition where even treated wastewater is not discharged to waterways or receiving environments
- which enables streams to be removed from pipes and provides space for surface flows beyond pipe network capacity
- in which centralised networks are enhanced by distributed systems e.g. homes and communities can capture roof runoff for use, recycle greywater for irrigation and non-potable use, and stormwater harvesting is considered a resource at a wider scale.

These aspirations respond to Shift 4 of the Water Strategy, *“Regenerative Infrastructure: Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders.”* Developing infrastructure that is resilient, regenerative, conspicuous, and mauri-enhancing is possible and will achieve good outcomes for all, while responding to the vision of the Water Strategy *“Te Mauri o te wai o Tāmaki Makaurau – the life-sustaining capacity of Auckland’s water, is protected and enhanced”*.

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